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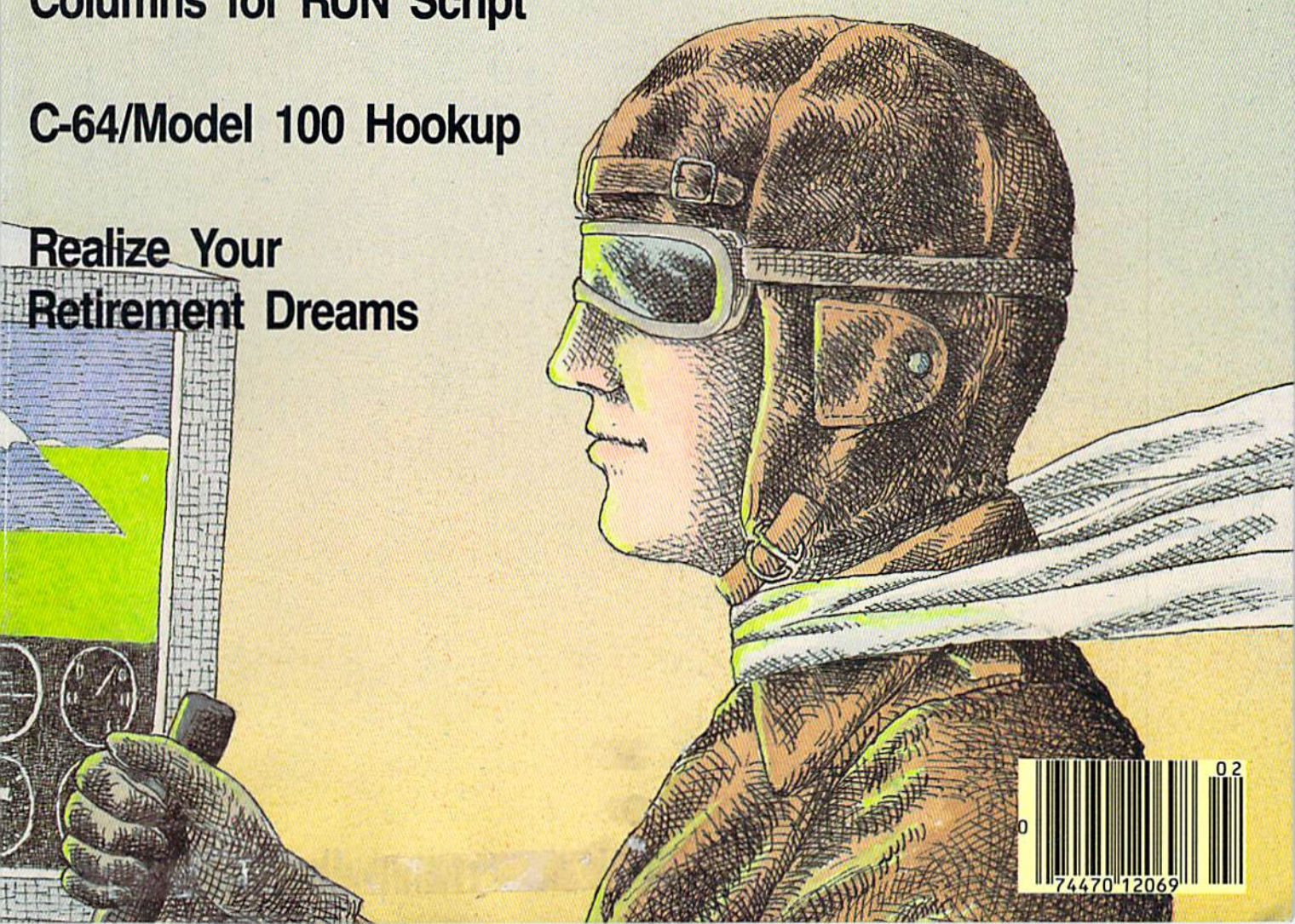

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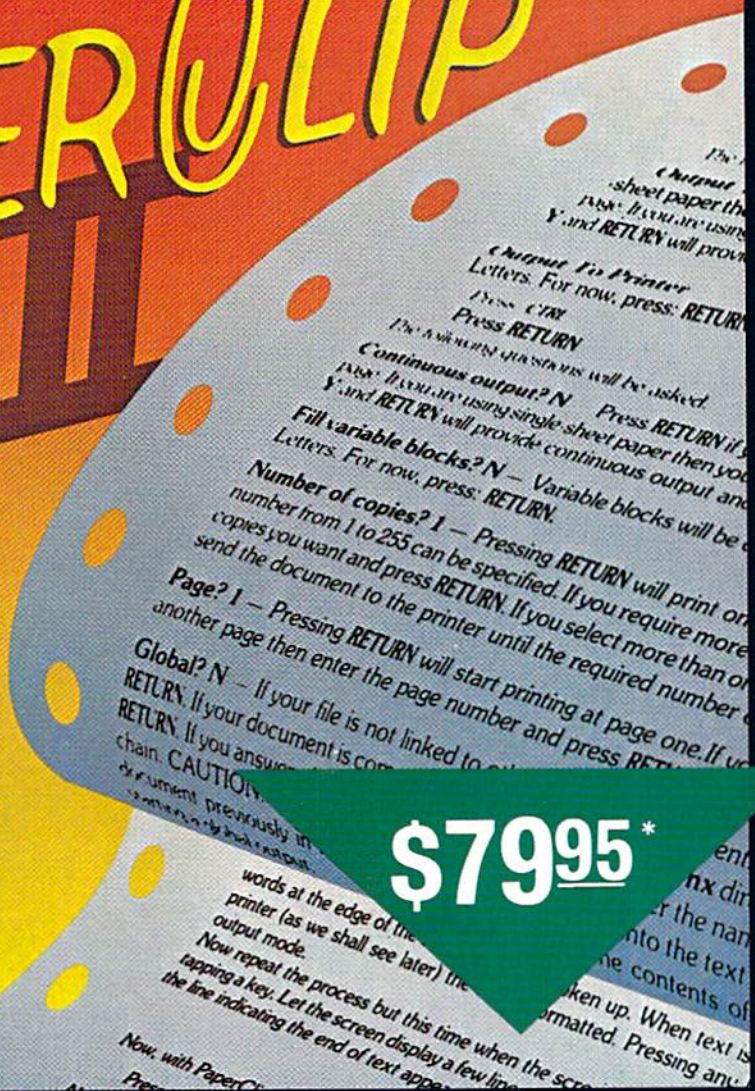

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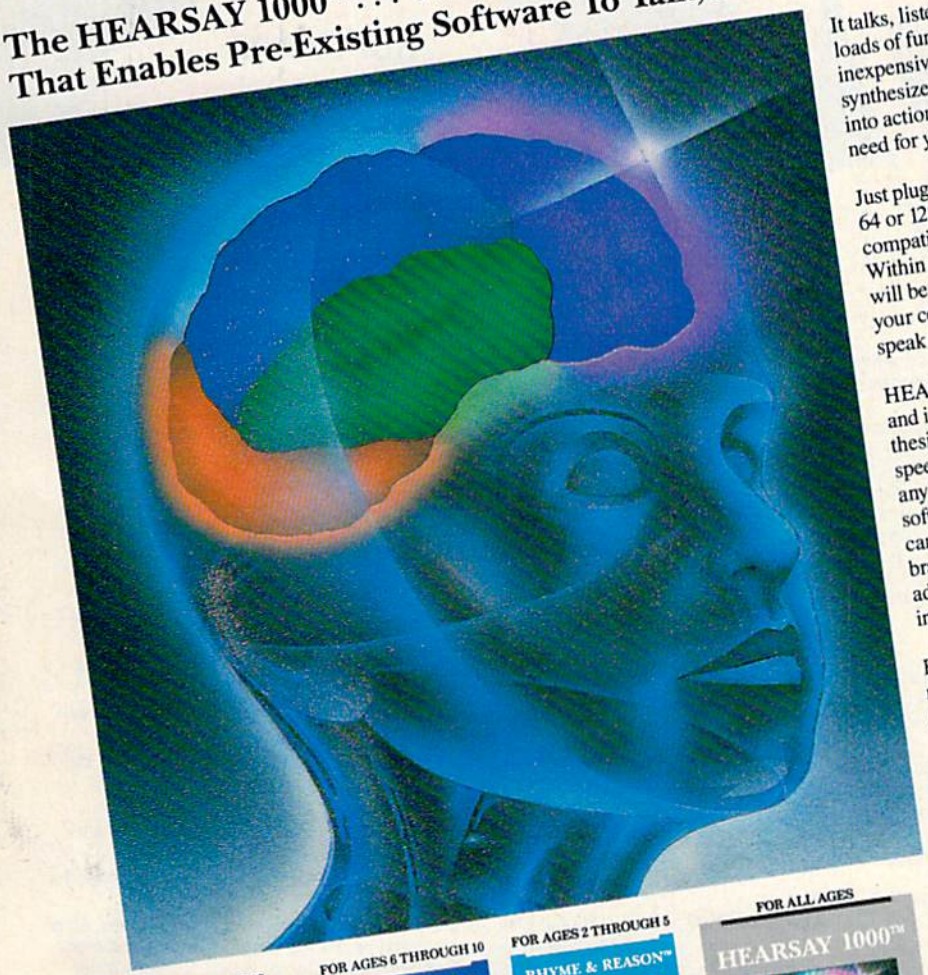

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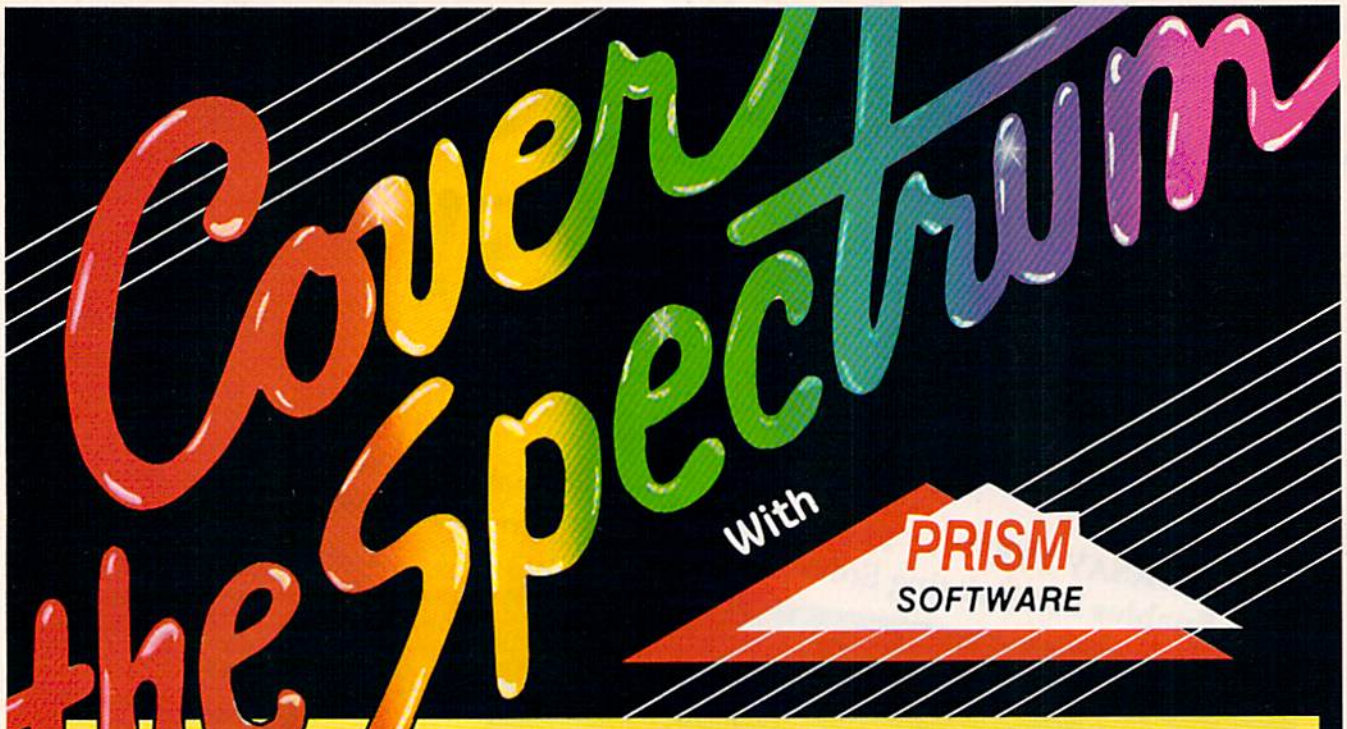

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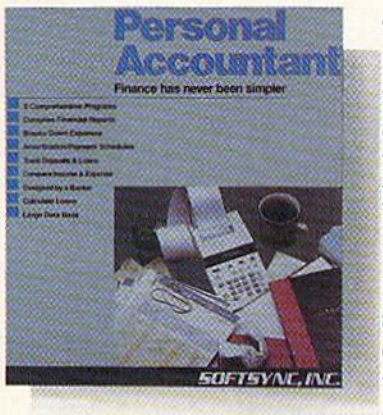

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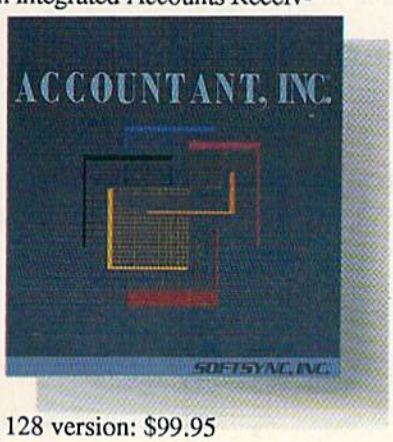

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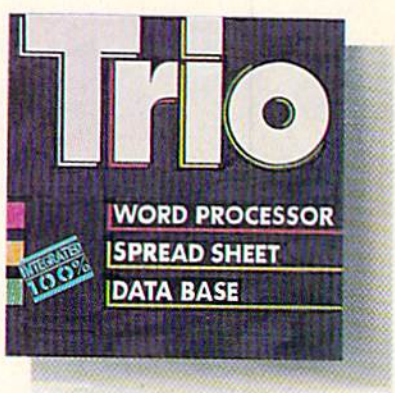

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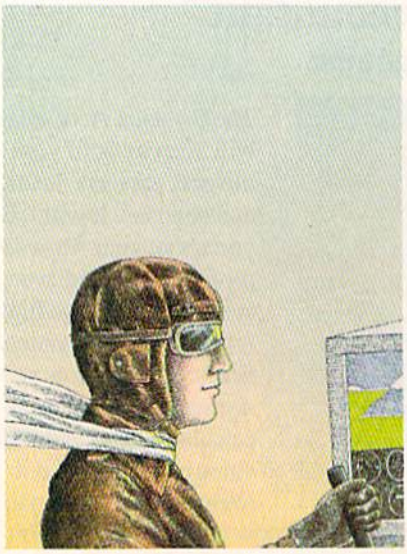
CONTENTS



COVER ILLUSTRATED
BY MEL FURUKAWA

FEATURES

YOU CAN FLY WITH YOUR C-64! *by Tim Walsh* 34
Take off with your computer and a flight simulator, but make sure the program you buy is airworthy.

***HOOK UP TO A PORTABLE** *by Howard Parnes* 42
Link your C-64 with a Radio Shack Model 100 for computing power you can take anywhere.

A DUAL POWER PACK FOR GEOS *by Matthew Stern* 50
The first two of several enhancements planned for GEOS include an assortment of type fonts and a collection of utilities and accessories.

***DATAFILE 3.6** *by Mike Konshak* 54
RUN's powerful C-64 database program has been improved since last published in *RUN*, although this is the same version that appeared in last fall's ReRUN Productivity Pak II.

***PATCHING UP RUN SCRIPT 128** *by Robert Rockefeller* 62
By adding a little code to *RUN*'s popular word processor, you can make it print in columns and on both sides of the paper.

***RETIR'EZE** *by C. Frank Schulenberg* 68
As you look toward retirement, let this program help clarify your financial situation.

***TWIDDLE** *by Michael Broussard* 76
Here's a C-128 board game that takes some unexpected turns.

***THE FUNCTIONAL COMPUTER** *by Jerald A. Brown* 86
Enhance the math capability of your Commodore by giving it 32 more functions than Basic provides.

***BREAK THE 128 MEMORY BARRIER** *by M. Garamszeghy* 92
Now your RAM-expanded C-128 can have true RAM disk capability.

DEPARTMENTS

RUNNING RUMINATIONS 8
Contest winners announced.

MAGIC *by Jim Borden* **10**
The original column of hints and tips for performing computing wizardry.

***MEGA-MAGIC** *by Jeffrey Goode* **13**
Tips and techniques that are bigger than Magic. This month: fast hi-res screen dumps with the C-128.

SOFTWARE GALLERY **16**
Reviews of:

- Transformers
- Tass Times in Tonetown
- Super Cycle
- Chessmaster 2000
- Bobsterm Pro
- Checks & Balances
- Paper Models: The Christmas Kit
- Battlefront
- WordPro 128/S
- Fastfile

***EASY APPLICATIONS** *by John Hundley* **96**
Short, but useful, applications for your Commodore computer. This month: a program that prints multiple mailing labels with the same address.

TELECOMPUTING WORKSHOP *by David Bradley* **98**
Advice and answers to your questions on modems, terminal programs, bulletin boards and more.

THE RESOURCE CENTER *by Margaret Morabito* **100**
Commodores can provide low-cost computer support to the handicapped.

COMMODORE CLINIC *by Jim Strasma* **111**
Got a problem or question related to Commodore computing? This monthly column provides the answers.

MAIL RUN **114**

NEW PRODUCTS RUNDOWN **116**

HOW TO TYPE IN LISTINGS **120**

CHECKSUMS FOR 1985 PROGRAMS **124**
We cover January and February programs this month.

LIST OF ADVERTISERS **128**

COMING ATTRACTIONS **128**

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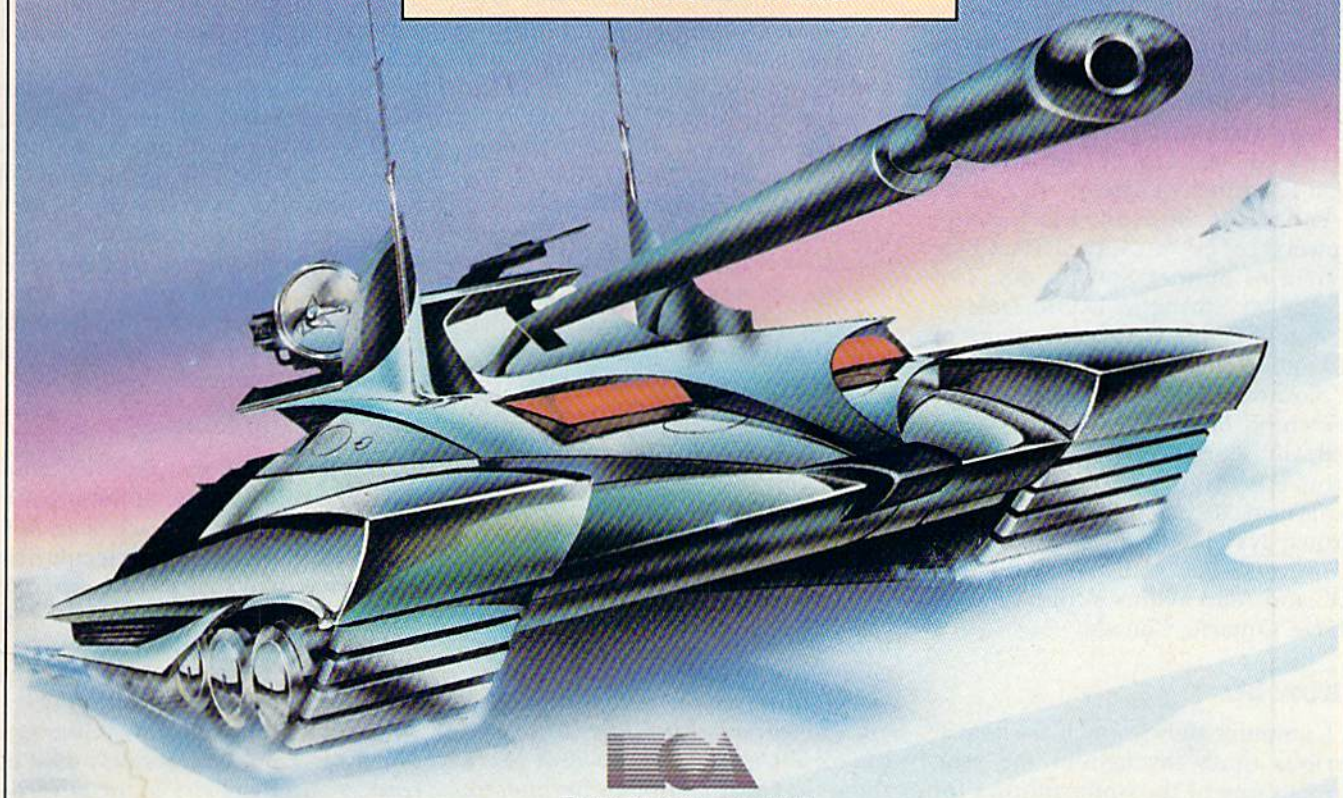

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RUN is pleased to announce the following winners of the second RUNaway contest. Twenty names were selected in a drawing held November 3. They will share over $25,000 worth of prizes, which include software, hardware and computer accessories provided by manufacturers and distributors.

We would like to extend our congratulations to the lucky winners and our appreciation to all of the *RUN* readers who participated and to those companies who generously donated to the contest.

The winners were: Mrs. Helen Ashton of White Plains, NY; Albert Choo of Ormond, Victoria, Australia; Stanley Darmofal of New Bedford, MA; T. M. De Leon of Burbank, CA; Joan P. Farmer of Tucson, AZ; Brian J. Fenzel of Clinton, IA; JoAnne Gowerski of Lower Burrell, PA; Clyde Herrin of Bonner Springs, KS; Tim A. Hill of Springfield, OR; Dale V. Ketten of Dupo, IL; Mark Koenigs of Mountain Home, ID; C. T. Lingenfelser of Savannah, GA; Jeanine Messner of Brownton, MN; Michael Mo of Campbell, CA; Marvin Nakajima of Honolulu, HI; Miguel Ortiz-Olguin of Espartaco, Mexico; William Riviera of Bronx, NY; James Starkey of Claremore, OK; Pat Watts of Lexington, KY; and Alan Wilinson of Sault Ste. Marie, Ontario, Canada.

SHOW BIZ

Computer shows, which are held at various times throughout the year, present one of the opportunities for magazine editors to meet readers, users, dealers and manufacturers. It's also an opportunity for editors to preview products at various stages of development—a few in prototype form, most ready to hit the market, and many we've seen before.

As this is being written, we have recently returned from The World of Commodore Show in Toronto and are preparing to attend the Consumer Electronics Show in Las Vegas.

Toronto—traditionally a hotbed of computing activity—was no disappointment this year. The show featured an impressive list of exhibitors and broke previous attendance records.

We had the opportunity to chat with Commodore officials and preview some of their latest products—most notably the IBM-compatibles and the proportional mouse (which is being called the model 1351). Neither the 64 RAM expander (model 1764) nor the 3½-inch disk drive (model 1581) was shown, but both are scheduled for release within the next month or two.

Also, we saw several hard disk drives (watch for reviews in our April issue) and previewed some as-yet-to-be-announced enhancements for GEOS from Berkeley Softworks. *RUN* will feature in-depth reviews of these products in subsequent issues.

The following month, the spotlight will be on Las Vegas for the CES show, which is bigger still and where the industry puts its best foot forward as developers showcase their best products for the coming year. For instance, GEOS was first demonstrated at last year's show (see the review of the latest applications for GEOS in this issue, p. 50), and at the previous year's show, the C-128 computer premiered.

What will the 1987 show be like?

Well, the mood of the industry, and particularly Commodore, appears to be upbeat, although somewhat guarded. As company president Thomas Rattigan was recently quoted as saying, "We have achieved a turnaround, but we still have a long way to go."

Commodore's back-to-back profitable quarters clearly indicate that the company is on its way back, and company officials, citing cutbacks and pared-down operating expenses, are optimistic in this holiday selling season that this profitable picture will continue.

According to one company spokesman, Commodore is committed to a "big presence" at the CES show, where, it is anticipated, several long-awaited new products will make their U.S. debut.

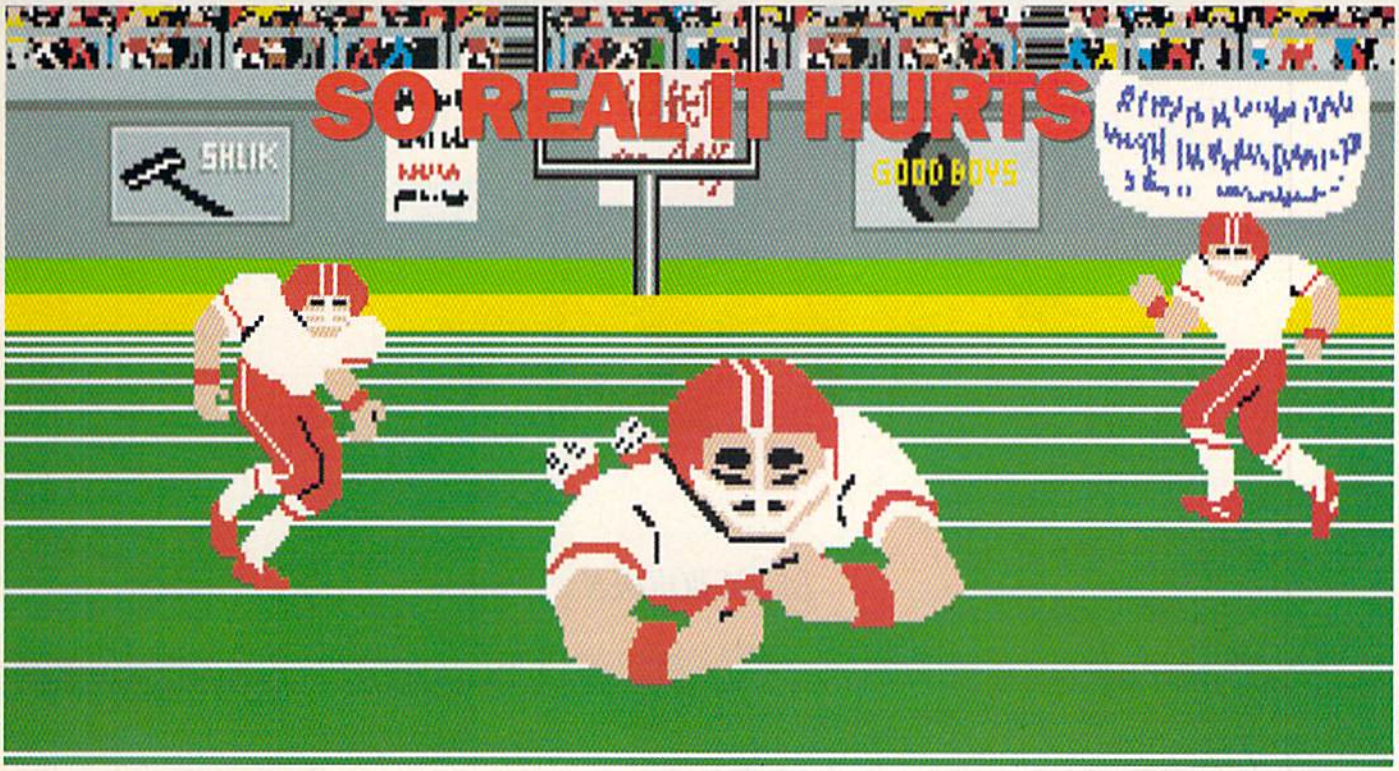
Commodore's new PC-compatibles and the proportional mouse will be displayed, and we are anxiously anticipating the release of their 64 RAM expander, as well as the 3½-inch disk drive. We'll keep our eyes open for these and other new hardware, applications and software. Next month we will recap the highlights of this show and focus on new products that were introduced.

THE TOP 400

RUN magazine was recently listed in *The Folio:400* as one of the top 400 magazines in the U.S. Each year, *Folio* analyzes the combined circulation and advertising figures of magazines and ranks the top 400. This year's results are based on 1985 figures and marks the first time that *RUN* has been listed—in 323rd position.

We consider this a prestigious event. The list is a tool that is widely used by readers and members of the advertising and marketing communities to ascertain which are the most influential publications in the country.

db



Amiga screen

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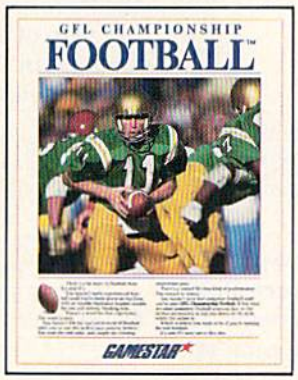

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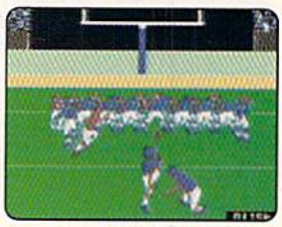
Amiga screen

Commodore 64-128 screen

Commodore 64-128 screen



Commodore 64-128 screen

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MAGIC

By JIM BORDEN

Magic is the original *column of reader-submitted hints and tips. Each month we present brief, useful computer "tricks" to help you get the most out of your Commodore computer system—whether you're a beginning or advanced computerist, a C-64 or C-128 owner. Magic is a forum for* RUN*'s imaginative and inventive readers to share their programming tips, brief software or hardware modifications, shortcuts or items of general interest. If you have an idea to make computing easier, faster, more exciting and enjoyable, send it to:*

Magic
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If your trick is accepted for publication in the column, you'll receive a colorful RUN *Magic T-shirt.*

Animate sprites and create a mini word processor with Poke commands; copy machine language files; print screen and color memory maps; merge DFReport and DFMail, and more.

$39B PET-to-ASCII—Have you discovered to your chagrin that non-Commodore computers do not appreciate receiving PETASCII character codes sent by modem? Try using this short program to convert your sequential text files to standard ASCII before you send them to one of those computers.

```
Ø REM PET-TO-ASCII - GREG DIXON
1Ø OPEN2,8,2,"SOURCEFILE,S,R":OPEN5,8,5,"EN
   DFILE,S,W"
2Ø IFEX=64 GOTO 8Ø
3Ø GET#2,Z$:Z=ASC(Z$):PRINTZ$;:EX=ST
4Ø IFZ>192 THEN IF Z<219 THEN Z=Z-128:GOTO6
   Ø
5Ø IFZ>64 THEN IF Z<91 THEN Z=Z+32
6Ø Z$=CHR$(Z):PRINT#5,Z$;
7Ø GOTO2Ø
8Ø CLOSE2:CLOSE5:END
```

Greg Dixon
North Vancouver, B.C., Canada

$39C C-128 restore disable—If you type in the Pokes below, you'll never have to worry about accidentally using the run-stop/restore combination and risk losing important information:

```
POKE 792,51:POKE 793,255
```

Pablo M. Eder
Buenos Aires, Argentina

$39D Byte-size sprite animation—In conventional sprite animation, several sprites, each showing a different stage of the given motion, are successively flashed on the screen. But you can also produce sprite animation with the Poke command to change individual bytes in the memory map of a given sprite. This will produce corresponding changes in the sprite as seen on the screen. The following routine shows one general approach:

```
1Ø REM BYTE-SIZE SPRITES-MARK AKSOY
2Ø FORI=1TO64:POKE16255+I,Ø:NEXT:REM CLEAR
   SPRITE
3Ø POKE 53248,2ØØ:POKE53249,2ØØ:POKE53287,7
   :POKE53281,Ø
4Ø POKE2Ø4Ø,254:POKE53271,1:POKE 53277,1:PO
   KE53269,1
5Ø FOR J=1TO2ØØ:RB=INT(RND(1)*64)+16256
6Ø POKERB,1Ø2:FORD=1TO15:NEXT D:POKE RB,Ø:N
   EXT
```

Line 20 pokes 64 zeros into the sprite map beginning at location 16256. Lines 30 and 40 set the sprite parameters for the "empty" sprite. You can flash on any pattern of bytes in this sprite. In this case, line 60 pokes 102 and then 0 into an address randomly chosen in line 50 and is repeated 200 times within loop J. You can use this pattern of blinking yellow bars as the exhaust of a rocket sprite or as an underwater shimmer effect if shown over a predrawn fish sprite. You can modify the above routine to yield numerous animated patterns with widespread applications, from simulating fire to enhancing the illusion of movement by other sprite objects. And it's all done byte by byte!

Mark Aksoy
Glenolden, PA

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$39E C-64 ML file copier—Copying machine language files is a bit more difficult than copying Basic programs: They must be loaded with the ,8,1 or ,1,1 syntax. The utility I've developed transfers most ML files from disk to disk (or tape) without having to know the starting or ending addresses. Program operation is straightforward; just answer the prompts. The source is the medium from which you load the original, and destination is the medium where you want the copy saved. In addition, the utility displays the starting and ending address of the ML file being copied.

```
10 REM 64 ML FILE COPIER-RICHARD PENN
20 PRINT"{SHFT CLR}{CRSR DN}{CTRL 9}INSERT
   SOURCE DISK/TAPE AND HIT RETURN"
30 GETA$:IFA$<>CHR$(13)GOTO30
40 INPUT"{2 CRSR DNs}ML FILENAME";F$:IF F$=
   ""GOTO40
50 INPUT"{CRSR DN}SOURCE:{6 SPACEs}{CTRL 9}
   T{CTRL 0}APE OR {CTRL 9}D{CTRL 0}ISK";D$
   :SD=8:IFD$="T"THENSD=1
60 INPUT"{CRSR DN}DESTINATION: {CTRL 9}T{CT
   RL 0}APE OR {CTRL 9}D{CTRL 0}ISK";D$:DD=
   8:IFD$="T"THENDD=1
70 PRINT"{2 CRSR DNs}LOADING "F$"...":POKE1
   47,0:SYS57812F$,SD,1:SYS62631
80 IFSD=1THENSL=PEEK(829):SH=PEEK(830):GOTO
   100:REM TAPE
90 OPEN2,8,2,F$:GET#2,A$,B$:Z$=CHR$(0):CLOS
   E2:SL=ASC(A$+Z$):SH=ASC(B$+Z$)
100 PRINT"{CRSR DN}"SL+256*SH"-"PEEK(174)+2
    56*PEEK(175)
110 PRINT"{2 CRSR DNs}{CTRL 9}INSERT DESTIN
    ATION DISK/TAPE AND HIT"SPC(14)"{CTRL 9
    }RETURN TO COPY"
120 GETA$:IFA$<>CHR$(13)GOTO120
130 PRINT"{2 CRSR DNs}COPYING "F$"...":SYS5
    7812F$,DD,1:POKE193,SL:POKE194,SH:SYS62
    957
140 INPUT"{2 CRSR DNs}DONE. COPY IT AGAIN (
    Y/N)";A$:IFA$="Y"GOTO110
```

Richard Penn
Montreal, Quebec, Canada

$39F C-64 programs on the C-128 II—Magic trick $326 (September 1986) recommends using the C-128 mode to type in C-64 programs because of the 128's extra editing features and its faster disk access. The trick also states that the programs should load and run without trouble in C-64 mode.

The advice is good, with one proviso: Don't let any Basic 7.0 keywords creep into your "C-64" programs. Should that happen, the C-128 will reduce the keyword to a 128 one- or two-character token the C-64 will not recognize. The only way of knowing you have this problem is when the line causes an error and, if listed, will either be missing a word or contain strange characters. For example, if you enter FOR LOOP = . . ., the C-128 will tokenize the (C-64) loop variable into a keyword token and will list in 64 mode as FOR CLOSE = ... You can simply edit the line in 64

Continued on p. 102.

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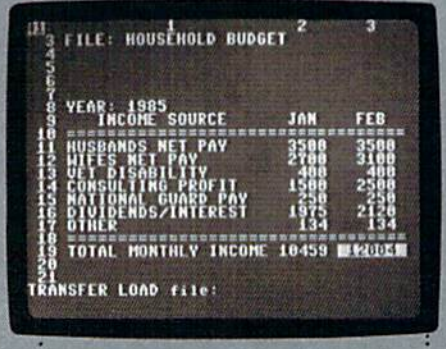

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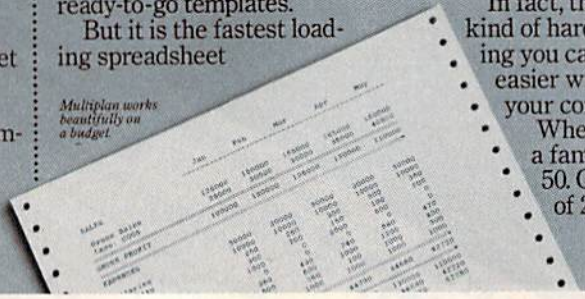
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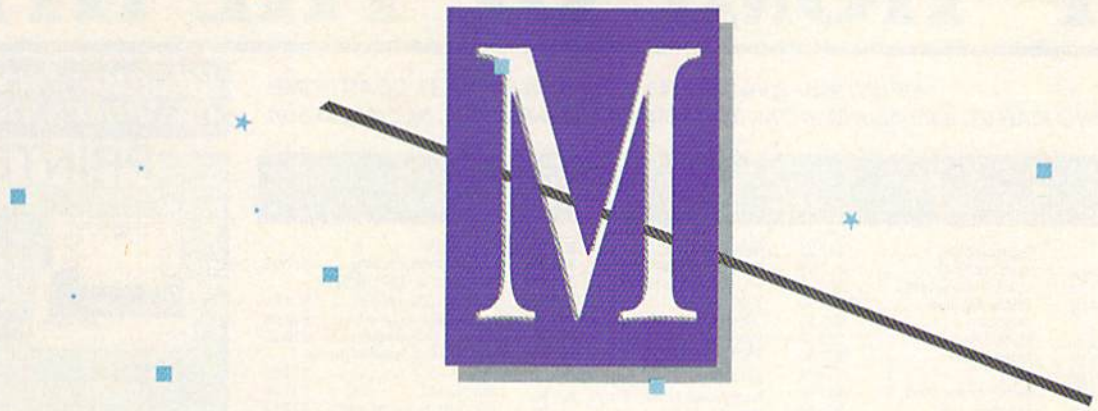

EASY-TO-USE SUBROUTINES AND UTILITIES

Fast C-128 Hi-Res Screen Dumps—My program contains machine language code that dumps hi-res screens to Star-compatible printers and includes two size options and a reverse video option.

When you save the program, the code will also be saved to disk; when you run it, the ML file is loaded instead of reading the data and poking it into memory. At the Ready prompt, set up your graphics screen and load or draw a picture to print.

Turn on your Printer, poke the column or reverse data (see options below) and use the SYS command for the size printout you want. It takes 3–4 minutes to print an 8½- × 11-inch picture vertically on the page (use SYS 4864) and about a minute to print a picture vertically on a quarter page (use SYS 4867).

You can position smaller pictures with POKE 4883,nc, where nc is the number of columns from the left margin to the bottom of the printed picture. Use a value of 0 to print a picture on the left side, 20 to center the picture and 40 to print the picture on the right side of the page. This Poke only affects pictures smaller than a full page, and it remains in effect until you change it with another Poke.

Control the Reverse Video option with a Poke to location 4887. If this location contains a zero (the default), the printout results in pixels turned on as black and those turned off (background) as white. Use POKE 4887,255 to reverse the color of the printed dots. As with the Column Position option, any change remains until you poke a different value.

Jeffrey K. Goode
Burlington, CT

Listing 1. *Screen Dump program.*

```
1 REM C-128 HI-RES SCREEN DUMPS (4X AND 1X)
                                    :REM*131
2 REM BY JEFFREY K. GOODE           :REM*84
3 OPEN 4,8,4,"%4X ML,P,R":CLOSE4:IFLEFT$(DS
  $,2)="ØØ"THEN BLOAD "%4X ML",BØ:NEW
                                    :REM*217
4 FORX=4864TO5386:READ A:POKEX,A    :REM*24Ø
5 C=C+A:NEXT:IFC<>48274 THEN PRINT "ERROR I
  N DATA":END                       :REM*253
6 BSAVE"%4X ML",P4864 TO P5387:NEW  :REM*12
7 DATA 76,38,19,76,135,2Ø,8,65,27,64,27,1,1
  44,75,27,Ø,2ØØ,75,27,Ø,77,27      :REM*35
8 DATA 32,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,1,4,16,64,3
  2,85,2Ø,169,Ø,141,32,19           :REM*64
9 DATA 169,1,141,31,19,162,3,189,11,19,32,2
  1Ø,255,2Ø2,16,247,169,24,141,27   :REM*255
1Ø DATA 19,169,7,141,28,19,173,27,19,162,64
   ,16Ø,1,32,6Ø,2Ø,162,Ø,172,22,19  :REM*142
11 DATA 32,42,2Ø,32,15,2Ø,169,8,174,32,19,1
   6Ø,Ø,32,6Ø,2Ø,166,25Ø,164,251,32:REM*169
12 DATA 15,2Ø,32,42,2Ø,172,28,19,177,25Ø,32
   ,198,19,173,3Ø,19,77,23,19,32    :REM*1ØØ
13 DATA 21Ø,255,32,21Ø,255,2Ø6,28,19,16,231
   ,2Ø6,27,19,16,18Ø,32,Ø,21,2Ø6,31  :REM*1
14 DATA 19,173,31,19,48,3,76,51,19,173,32,1
   9,2Ø1,39,24Ø,6,238,32,19,76,46   :REM*234
15 DATA 19,162,1,189,9,19,32,21Ø,255,2Ø2,16
   ,247,32,Ø,21,169,4,32,195,255,32:REM*195
16 DATA 2Ø4,255,165,6,141,Ø,255,96,174,31,1
   9,24Ø,4,74,74,74,74,41,15,141,29:REM*118
17 DATA 19,169,1,141,33,19,169,Ø,141,3Ø,19,
   141,24,19,173,33,19,45,29,19,24Ø :REM*39
18 DATA 24,174,24,19,189,34,19,141,25,19,17
   3,3Ø,19,13,25,19,14,25,19,13,25  :REM*64
19 DATA 19,141,3Ø,19,14,33,19,238,24,19,173
   ,24,19,2Ø1,4,2Ø8,211,96,72,138   :REM*199
2Ø DATA 72,165,25Ø,174,24,19,141,24,19,134,
   25Ø,165,251,174,25,19,141,25,19 :REM*192
21 DATA 134,251,1Ø4,17Ø,1Ø4,96,134,252,132,
   253,24,165,25Ø,1Ø1,252,133,25Ø   :REM*199
22 DATA 165,251,1Ø1,253,133,251,96,141,26,1
   9,134,252,132,253,169,Ø,133,25Ø  :REM*66
23 DATA 133,251,174,26,19,24Ø,6,32,46,2Ø,2Ø
   2,2Ø8,25Ø,96,173,Ø,255,133,6,169 :REM*55
24 DATA Ø,141,Ø,255,169,4,17Ø,168,2ØØ,32,18
   6,255,169,Ø,32,189,255,32,192      :REM*6
25 DATA 255,162,4,32,2Ø1,255,144,5,1Ø4,1Ø4,
   76,17Ø,19,162,4,189,6,19,32,21Ø   :REM*67
26 DATA 255,2Ø2,16,247,96,32,85,2Ø,162,2,18
   9,19,19,32,21Ø,255,2Ø2,16,247    :REM*186
27 DATA 169,Ø,141,29,19,162,3,189,15,19,32,
   21Ø,255,2Ø2,16,247,169,24,141,27:REM*117
28 DATA 19,169,7,141,28,19,173,27,19,162,64
   ,16Ø,1,32,6Ø,2Ø,162,Ø,172,22,19 :REM*16Ø
29 DATA 32,42,2Ø,32,15,2Ø,169,8,174,29,19,1
   6Ø,Ø,32,6Ø,2Ø,166,25Ø,164,251,32 :REM*67
3Ø DATA 15,2Ø,32,42,2Ø,172,28,19,177,25Ø,77
   ,23,19,32,21Ø,255,2Ø6,28,19,16    :REM*84
31 DATA 24Ø,2Ø6,27,19,16,189,32,Ø,21,173,29
   ,19,2Ø1,39,24Ø,6,238,29,19,76     :REM*241
32 DATA 154,2Ø,76,17Ø,19,169,13,32,21Ø,255,
   169,1Ø,32,21Ø,255,96              :REM*198
```

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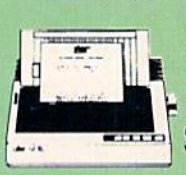

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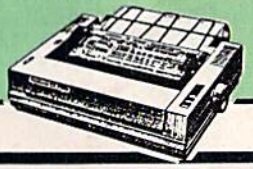

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Transformers

B+

No Longer Just Toys, Decepticons and Autobots Now Inhabit Your Computer

Transformers—fighting vehicles that transform into robots (and vice versa)—are one of the most successful toy lines ever marketed. In addition to spawning an animated cartoon series for TV and a full-length, animated movie, they've inspired Activision to stuff them into your computer.

Transformers remains true to the spirit of both the toy and the TV show. At least, that's the opinion of my son, who functioned as consultant during my evaluation of the game.

The one drawback, if indeed it can be called a drawback, is that the robots transform without any help from you. This problem is chiefly of concern to children who are good at twisting and turning the plastic parts. For any adult who has fumbled his way through the process and ended up with something that's neither robot nor vehicle, the automatic transformations are a blessing.

You're faced with the Evil Decepticons' new plan to capture the energy supplies of Earth. As commander of the good guys, the Autobots, you must determine the nature of their plan, with the help of a stolen map, and then do battle to foil them.

You command eight Autobots, each with his own fighting characteristics, and you must deploy them to the eight possible targets. The deployment

Transformers: The battle to save the earth.

method is quick and easy and won't strain the attention spans of the children for whom the game is intended.

Once deployment is complete, the screen changes to show the selected Autobot in his robot form. In an animated sequence, he then changes into a vehicle and races off toward his assignment.

You can press View to see through the eyes (or sensors) of your Autobot. As you survey the scene, you must search for anomalies. Remember that the Decepticons are also shape-changers and the most innocent-looking structure can erupt into a deadly fighting machine.

In the Barrage mode, you can preselect up to eight different targets. When the battle begins, your fire upon these points will be automatic, leaving you and your joystick free to fire at others.

Pick your targets carefully, however. Although almost anything might be a Decepticon, willy-nilly destruction of property is not the Autobot way. Besides, you can earn bonus points for keeping civilian life and property from harm.

If you don't already know that each Autobot has his own personality and physical limitations, any child within shouting distance will be glad to point this out to you. Knowing this, plus a careful study of clues in the documentation, will aid you in placing your Autobots where they'll do the most good.

Since energy is the disputed treasure of Transformers, it follows that scoring is based on units of energy accumulated.

As a computer game for the 9-to-14 age group, Transformers will probably please every youngster with it's combination of strategy and arcade action. There are 32 levels of achieve-

Continued on p. 22.

Report Card

A — ***Superb!*** An exceptional program that outshines all others.

B — ***Very Good.*** One of the better programs available in its category. A worthy addition to your software library.

C — ***Good.*** Lives up to its billing. No hassles, headaches or disappointments here.

D — ***Mediocre.*** There are some problems with this program. There are better on the market.

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Be prepared to take evasive action. In *Infiltrator*™ by Chris Gray, you're Captain Johnny "Jimbo Baby" McGibbits, ace chopper jockey. Your mission is no day at the races. When you make it through hostile enemy airspace, this realistic flight simulation converts to covert ground-based animated graphic adventure. Now just destroy the mad leader and his angry troops. Thumbs up!

Get ready to work some magic. *Spell of Destruction*™ makes you a wizard's apprentice inside the Castle of Illusions. You must find and destroy the Prime Elemental. You're armed with a supply of spells and fireballs, but there are plenty of lessons to learn before you pass the Loremaster's challenging trial. Music and 3-dimensional graphics of 70 eerie locations make this adventure truly awesome.

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Without question, this quest is for you. *Fairlight*™ combines magic, adventure, strategy, and action as you meet the challenge to find the Book of Light. You're in a far away and ancient land. But 3-dimensional high-resolution graphics make it all seem real. This epic will grab you. Only the strong and resourceful will conjure up the courage it takes to survive.

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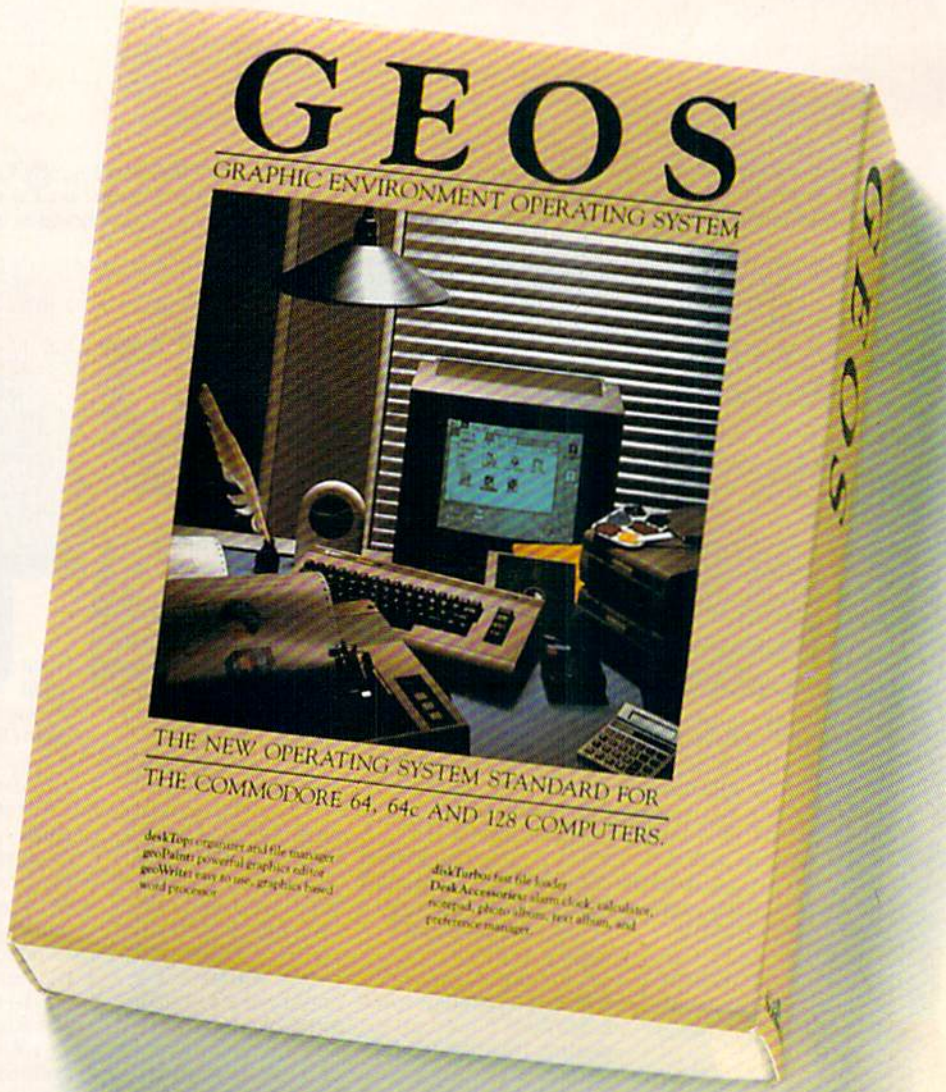
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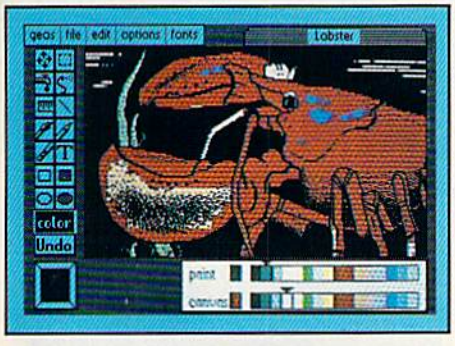

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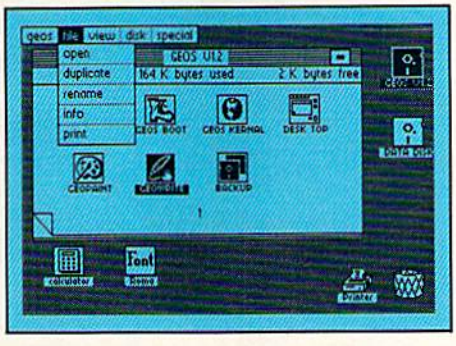

thing about a new universe is finding your way around. But with GEOS, you only need to remember two things:

Point and click.

When GEOS offers you options, you just point to your answers and click your mouse or joystick.

You want to draw? Point and click.

You want to write? Point and click.

You want to fill in that obtuse rhomboid with an air-brushed geometric pattern in a lighter shade of pink? Point and click.

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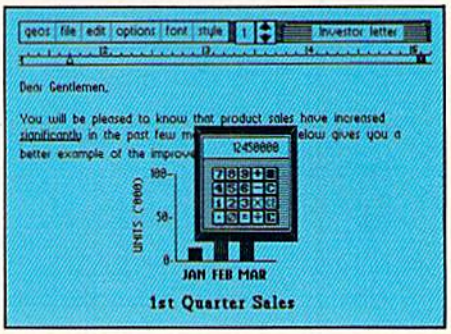

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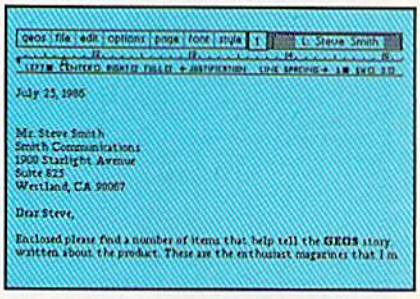
Sharpen your skills. The first thing to do in the Workshop is plug into geoWrite 2.0, which contains all the brand new tools you need to hone any rough concept into a well-crafted document.

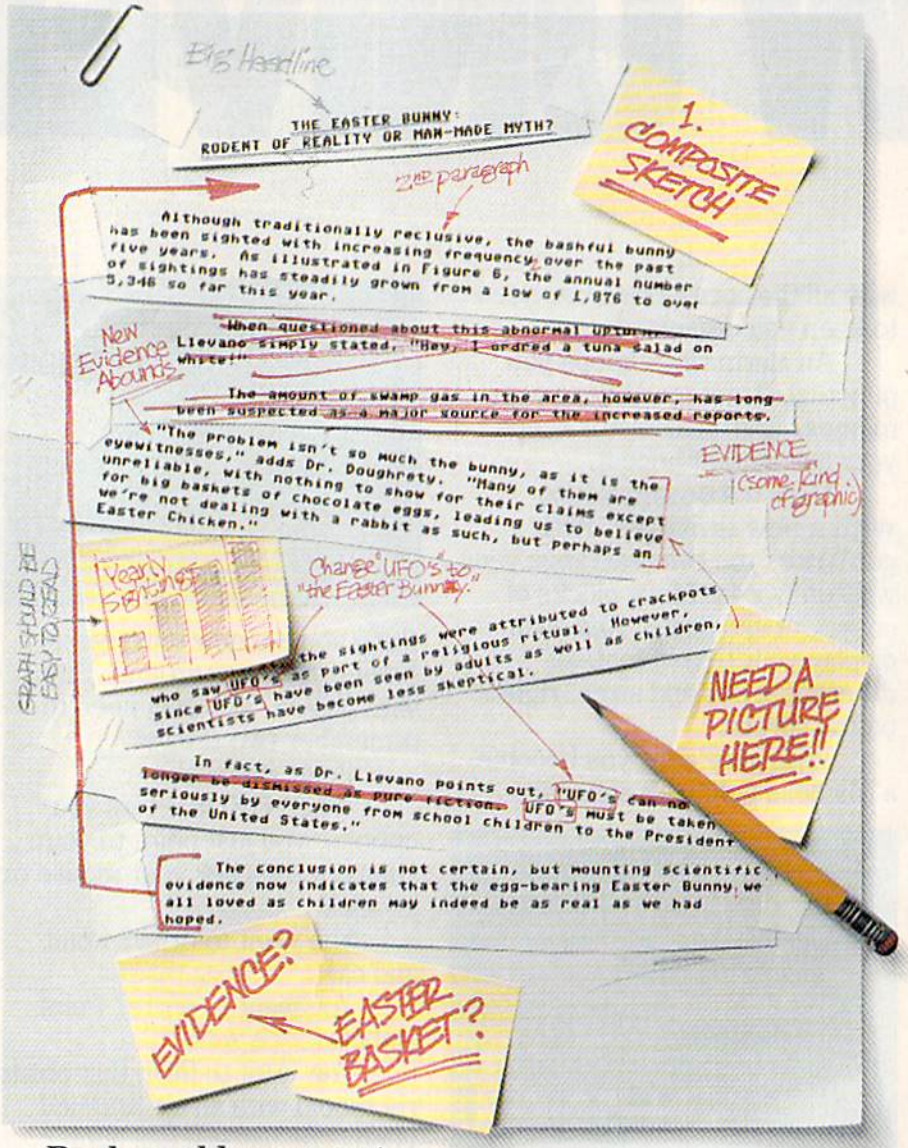
You get headers. Footers. Subscripts and superscripts. You can center your text. Right justify. Full justify. And nail


geos | file | edit | options | page | font | style | 1
July 25, 1986
Mr. Steve Smith
Smith Communications
1900 Starlight Avenue
Suite 825
Westland, CA 90067
Dear Steve,
Enclosed please find a number of items that help tell the GEOS story written about the product. These are the enthusiast magazines that I'm

down formatting problems with variable vertical spacing and adjustable margins.

The Workshop cuts down on your manual labor, too. With one-stroke, "shortcut" keyboard commands. They keep your hands off the mouse so you can keep your mind on your work.

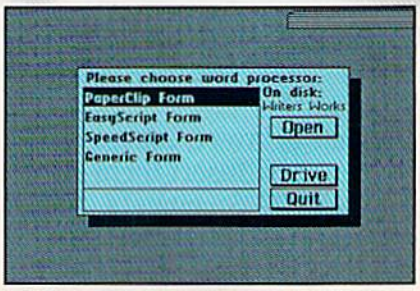
In fact, there's a complete set of heavy-duty accessories that not only strengthen your writing, but reinforce its structure, as well.


Big Headline
THE EASTER BUNNY:
RODENT OF REALITY OR MAN-MADE MYTH?
1. COMPOSITE SKETCH
2nd paragraph
Although traditionally reclusive, the bashful bunny has been sighted with increasing frequency over the past five years. As illustrated in Figure 6, the annual number of sightings has steadily grown from a low of 1,876 to over 5,346 so far this year.
New Evidence Abounds
Llevano simply stated, "Hey, I ordred a tuna salad on white!"
The amount of swamp gas in the area, however, has long been suspected as a major source for the increased reports.
"The problem isn't so much the bunny, as it is the eyewitnesses," adds Dr. Doughrety. "Many of them are unreliable, with nothing to show for their claims except for big baskets of chocolate eggs, leading us to believe we're not dealing with a rabbit as such, but perhaps an Easter Chicken."
EVIDENCE (some kind of graphic)
Yearly Sightings
Change "UFO's" to "the Easter Bunny"
GRAPH SHOULD BE EASY TO READ
the sightings were attributed to crackpots who saw UFO's as part of a religious ritual. However, since UFO's have been seen by adults as well as children, scientists have become less skeptical.
NEED A PICTURE HERE!!
In fact, as Dr. Llevano points out, "UFO's can no longer be dismissed as pure fiction. UFO's must be taken seriously by everyone from school children to the President of the United States."
The conclusion is not certain, but mounting scientific evidence now indicates that the egg-bearing Easter Bunny we all loved as children may indeed be as real as we had hoped.
EVIDENCE?
EASTER BASKET?

Replace old, worn-out parts. You can build anything with Writer's Workshop. And repair old stuff, too. Just decide which parts have to come out and which new ones go in.

Then hit the key and stand back.

Instantly, the "search and replace" drills through your old



Circle 111 on Reader Service card.

GEST CASES H A WORKSHOP.

THE EASTER BUNNY:
Rodent of Reality or Man-Made Myth?

The conclusion is not certain, but mounting scientific evidence now indicates that the egg-bearing Easter Bunny[1] we all loved as children may indeed be as real as we had hoped.

Although traditionally reclusive, the bashful bunny has been sighted with increasing frequency, over the past five years. As illustrated in Figure 6, the annual number of sightings has steadily grown from a low of 1,876 in 1982 to over 5,346 so far this year.

1. The Easter Bunny, depicted by composiae sketch.

A+ EXCELLENT!!

1982 1983 1984 1985

Figure 6: Increased sightings, 1982 to present.

NEW EVIDENCE ABOUNDS

"The problem isn't so much the bunny, as it is the eyewitnesses," adds Dr. Dougherty. "Many of them are unreliable, with nothing to show for their claims except for big baskets of chocolate eggs[1], leading us to beleieve we're not dealing with a rabbit as such, but perhaps an Easter Chicken."

At first, the sightings were attributed to crackpots who saw The Easter Bunny as part of a religious ritual. However, since The Easter Bunny has been seen by adults as well as children, scientists have become less skeptical.

In fact, as Dr. Llevano points out, "The Easter Bunny must be taken seriously by everyone from school children to the President of the United States."

Figure 4: Evidence submitted by Dr. Dougherty.

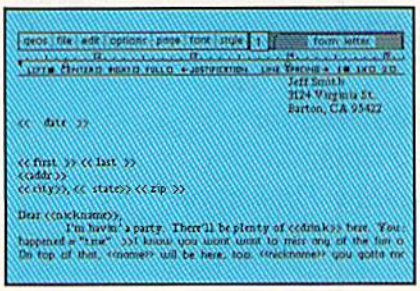
text, replacing worn-out words and phrases with your brand new ones.

For more serious cases, hand the job over to the Workshop's Text Grabber. It takes text from several word processors—like Paper Clip™—and lets you overhaul them with new GEOS fonts, formats and graphics.

A few more built-in features. Every project leaves the Workshop looking beautifully finished, too. Because it not only comes with LaserWriting compatibility, there's even a LaserWriter for you to print on.

You simply upload your files to QuantumLink.™ Then they're printed and mailed back.

Convenient, or what?



Of course, you don't want to keep good-looking documents like this to yourself. So we built in geoMerge. Which customizes your geoWrite form letters to people on your mailing lists.

So if your plans call for some real masterpieces, do something really constructive about it. Call your software dealer and requisition Writer's Workshop.

Who knows? You just might build a name for your self.

To order call 1-800-443-0100 ext. 234
Writer's Workshop $49.95
(California residents add 6.5% sales tax.)
$2.50 US/$5.50 Foreign for shipping and handling. Allow six weeks for delivery.

Commodore is a trademark of Commodore Electronics, Ltd. GEOS, Writer's Workshop and Berkeley Softworks are tradenames of Berkeley Softworks. Paper Clip is a registered trademark of Batteries Included.

WRITER'S WORKSHOP

GEOS COMPATIBLE

Berkeley Softworks

The brightest minds are working at Berkeley.

Circle 111 on Reader Service card.

Software Gallery

From p. 16.

ment based upon both scoring and playing skills. So, while your child is tying up your computer, perhaps you can sneak into his room and try again to make that pesky robot look like a tank. *(Activision, Inc., 2350 Bayshore Parkway, Mountain View, CA 94039. C-64/$34.95 disk.)*

Ervin Bobo
St. Peters, MO

This is your grandfather's main living area in a secluded, winterized log cabin deep in the northern woods. The dining table has an order slip
(More)
Return

Are things really that tass in Tonetown?

Tass Times In Tonetown

B+

Get Ready for A Trip to Another Dimension

Maybe the times aren't so tass after all. Once you've been eaten by a crocogator or disposed of by a very large snake named Franklin Snarl, you begin to wonder.

Of course, if you can achieve tone and therefore avoid being spotted as a stupid tourist, you just might have a chance of surviving long enough to solve the mystery of Tonetown. If you don't believe me, ask the dog. Tass Times in Tonetown carries the interactive graphic adventure to a new dimension—literally.

As the mystery begins, you're searching for Gramps, who has disappeared from his laboratory, leaving behind a playful dog and a half-eaten pizza. Once you find a way into the locked lab, you'll discover a suspended hoop connected to a large generator. The dog is bouncing through the hoop, and as you idly turn on the generator, he disappears in a shower of sparks. Of course, you must follow.

You'll soon discover that the dog has been transformed. He now wears a hat, probably having achieved tone, and is able to talk. Talk to him occasionally—he understands more about Tonetown than you do and will serve as a guide if you let him.

In order to speak with its inhabitants, you must learn the dialect of Tonetown and sprinkle your conversations with words such as tass, tone and moonup. Furthermore, you must always address them by their first names, or they won't respond.

As with other adventure games, the solution is arrived at by exploration: Move in various directions, pick up everything that isn't nailed down and watch the screen for clues. Whether you can assemble the parts to the puzzle is another matter.

The screen is divided into sections. At upper left is a graphic picture of the room you occupy, and directly below it is the section where your conversations with the parser will appear. The right half of the screen includes a section for inventory, as well as icons to help you move by pointing and clicking. Below this, another graphics section presents several pictures representing common commands such as pickup, talk and listen.

Pointing and clicking on one of these pictures prints a partial phrase in the text area, exactly where it would have been had you typed it. The Point and Click option seems to be an aid to proper syntax, rather than an aid to speed.

For those new to interactive exercises, the ability to point with the joystick and select with the fire-button may make adventuring a bit more exact, but older hands will probably prefer the parser.

Tass Times' graphics are outstanding. Despite the fact that the picture of your location occupies only a quarter of the screen, the details are clear and sharp. When you specify a move, the screen changes quickly, with a smooth wiping effect that doesn't slow the game. In addition, individual frames seem to include more animation than previous adventures along this line.

The sound is also very good, from the deep hum of the generator to the blasting of a Tonetown rock group. There's enough documentation to show you how to move through the game; after that, you're on your own.

A recent copy of the Tonetown Times is included, the lead story having to do with the disappearance of Gramps. I suggest you read the entire issue carefully. You never know where you might find a clue that will lead to Gramps or let you survive a little longer.

And, yes—stay on the path and take along plenty of guitar picks! *(Activision, Inc., 2350 Bayshore Parkway, Mountain View, CA 94043. C-64/$34.95 disk.)*

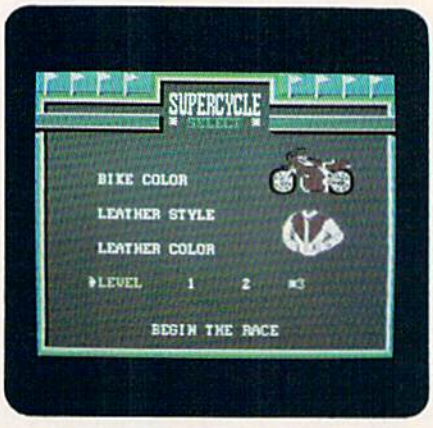
Ervin Bobo
St. Peters, MO

Super Cycle

B

Put on Your Helmet And Get a Piece of Fast Motorcycle Racing Action

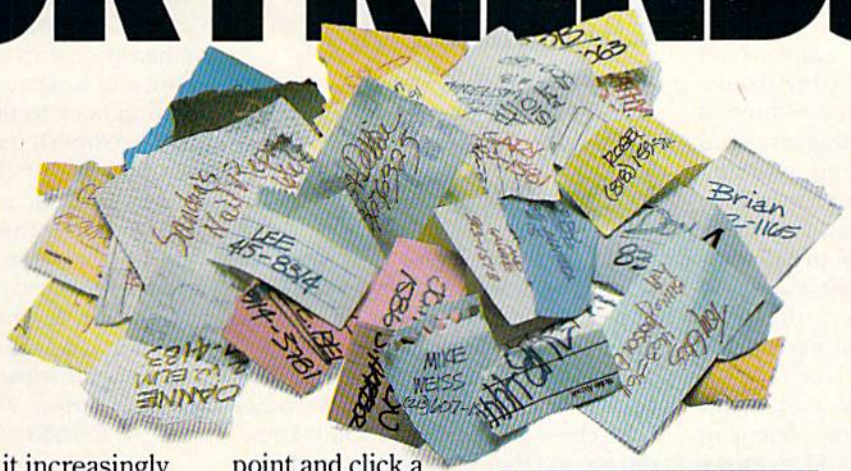
Super Cycle is an arcade-style racing game that puts you behind the handlebars of a powerful 750cc motorcycle. The challenge is to complete 12 different race courses within the allotted time limit. You must rely on your instincts, reflexes and racing skill, and even after you have mastered control of your own motorcycle, you'll still have to deal with deteriorating road conditions and other racers.



Outfit your rider with Super Cycle.

Super Cycle's instrument panel consists of a speedometer, tachometer and three indicator lights that show what gear you're in. Below these gauges is a digital display indicating your total score and the amount of time you have left to complete a

ARE YOU SEARCHING FOR FRIENDS?

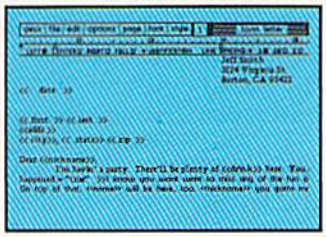


If you're finding it increasingly difficult to find anything at all, maybe it's time you found out about geoDex. The GEOS-compatible directory that generates mailing lists. Prints address labels. And sorts out all sorts of things for your Commodore.

Try directory assistance. With a little help from geoDex, you can call up a directory organized from any three categories you choose. Which means you can list your friends by name, telephone number or almost anything else that can be assigned its own three-character code.

Like "MEN" for guys you know. Or "GRL" for girls you know. Or "FOX" for girls or guys you'd like to know.

But no matter how you choose to categorize them, if you can point and click a mouse, you can call up any list of friends with geoDex's easy-to-read graphics.



Our most inviting feature. Of course, once you've gotten your friends organized, the next thing we recommend you do with geoDex is really very simple.

Throw a party.

You see, geoDex comes with geoMerge, a mail merge program that customizes form letters, announcements—even party invitations—with the names and addresses stored in geoDex. First you write the letter with geoWrite. Then you select a list from geoDex.

Put them both together with geoMerge and it's toga time!

The search is over. So if you're tired of looking for friends, waltz right down to your software dealer and ask him for geoDex. We can't guarantee it'll win you more friends, but it'll certainly keep you from losing them.

To order call 1-800-443-0100 ext. 234

geoDex $39.95

(California residents add 6.5% sales tax.)

$2.50 US/$5.50 Foreign for shipping and handling. Allow six weeks for delivery.

Commodore is a trademark of Commodore Electronics, Ltd. GEOS, geoDex and Berkeley Softworks are tradenames of Berkeley Softworks.

GEODEX

Berkeley Softworks

The brightest minds are working at Berkeley.

Circle 139 on Reader Service card.

course. The simplicity of the instrumentation can be a real advantage, because rapidly changing road conditions usually require you to keep both eyes glued to the course.

Epyx has done a good job with the sound, graphics and animation. As you speed down the two-lane road, distant objects like light posts, signs, trees and other cycles evolve from tiny dots into colorfully detailed objects before whizzing past. Your on-screen cyclist even shifts his weight realistically, lowering his knee to almost scrape the road as you skid around the curves.

The sound effects are appropriate to your activities, progressing from a low rumble to a finely tuned whine as you shift up through the gears, and even providing a chilling skidding sound if you begin losing control.

The race courses range from simple two-lane roads with predictably alternating left and right curves to pothole-covered roads with cones and wooden barriers that narrow the course down to a single lane.

There are both day and night courses, a rainy course complete with thunder and lightning and a snowy course with occasional slippery patches of ice. Every fourth course is a bonus track with regularly spaced flags that you must run over for points.

Although Super Cycle offers a good variety of tracks and three skill levels, the game would benefit from more of a construction set format. It would be nice, for example, to be able to try out different types of motorcycles, like dirt bikes, and to experiment with various engines and tires. Simply being able to change the color of the motorcycle and the style of your rider's leather jacket doesn't make the game more enjoyable.

These minor complaints aside, however, Super Cycle handily re-creates the pulse-quickening action of a racing game. It won't give you a lot to think about, but it's the type of fun you'll find yourself returning to every time you need a shot of adrenaline-pumping action. *(Epyx, 1043 Kiel Court, Sunnyvale, CA 94804. C-64/$39.95 disk.)*

Bob Guerra
Charlestown, MA

With Chessmaster 2000, it's your move.

Chessmaster 2000

Electronic Arts' New Chess Game Has All the Right Moves

A

At last count, there were over six chess programs available for the C-64. One of the latest entries, and also one of the best, is Chessmaster 2000.

The first thing that distinguishes Chessmaster 2000 from most other C-64 chess games is its display. In addition to the standard two-dimensional chessboard usually offered, Chessmaster 2000 lets you play with a three-dimensional board that can be rotated to view any of the four sides. You can even switch from one board to the other in the middle of a game without disturbing a single piece. Unfortunately, the realistic 3-D perspective is more attractive than it is practical, and you'll probably find it easier to spot developing attacks and plan your own strategy using the conventional 2-D board.

You can play against another person while Chessmaster monitors the game; let the program play against itself while you watch; or play against the computer using any one of 19 skill levels. There is an Easy mode that can be used at any level to stop Chessmaster from thinking while it's your move, and a Coffeehouse mode in which Chessmaster plays a more relaxed game.

Moves are entered using the standard algebraic notation and can be taken back by pressing the back-arrow key. All legal moves are allowed, including castling, capturing *en passant* and pawn promotion.

While Chessmaster 2000 contains an opening library of over 71,000 positions, it also has several features that make it perfect for the beginner. For example, you can request a hint if you're in a tight spot, or ask Chessmaster to show you the next move it's considering. You can also turn on a special Teaching mode that displays all moves for any piece you select. In addition, you can set up the board with chess problems to solve.

You can output your move list to a printer, and games-in-progress or completed games can be saved to disk. Chessmaster 2000 comes with a library of 100 famous games, among which are two between Chessmaster 2000 and Sargon III, the final World Championship game between Karpov and Kasparov and several others dating back to the 18th century.

The superb user's manual contains a summary of those games, a three-page tutorial, a history of greatest players, an informative discussion on the link between chess and computers and a bibliography of selected chess books for beginner, novice, intermediate and advanced players. *(Software Country; distributed by Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404. C-64/$39.95 disk.)*

Bob Guerra
Charlestown, MA

Bobsterm Pro

A

Attention Telecomputerists! Here's a Dandy Program For You

As someone interested in telecomputing, I know about the wait C-128 owners have had for full-featured telecommunications programs that take total advantage of the 128 mode. Among the programs now available, Bobsterm Pro is top-notch.

The program is strictly for use with the 128. It requires that you have either an RGB or monochrome monitor, since it operates exclusively in 80-column mode. After booting the program, you'll notice that the type font is different. Seven fonts are available, although I've found most of them more difficult to read than the normal default characters.

Bobsterm Pro is menu-driven and

the menus are well-designed. The only problem I had here was in learning the program's particular definition of various terms, but they're detailed in the voluminous instruction manual.

There's a very versatile 60K buffer available with Bobsterm Pro. You have full editing control on the buffer, and you can fill it from disk, the Terminal mode or the keyboard. Bobsterm Pro supports two major forms of file transfer: XModem and Punter.

This package will also let you place programs being downloaded directly onto a CP/M-formatted disk. An extensive range of conversions are available to handle just about any kind of file transfer you can imagine. This program has the widest variety of such utilities I've ever seen in one package.

Bobsterm Pro will emulate a VT-100, VT-52 and ADM-31. While no promises are made for other terminal types, you can create custom emulations that should take care of virtually any terminal around.

The program is protected by a dongle. It can be copied for backup, but, without the special dongle, the program will not run.

The advertising for Bobsterm Pro indicates that the program includes a remote-access capability that can serve as a mini-BBS. The Remote Access mode is truly impressive and useful, but I think the mini-BBS description is a bit off base.

In the Remote mode, your 128 will answer incoming calls. If you desire, a password can be programmed to limit entry. Once someone has successfully logged on, they have access to all the DOS commands available on the 128! You are warned that, with full access to the DOS, there's a danger of corrupting or erasing files, so keep security in mind if you employ this feature. Files can be transferred in either direction. No provision is made for leaving messages per se, though a caller could upload a message file that would be saved to disk.

Bobsterm Pro supports macros, autodialing, phone number lists and much more.

If you particularly need remote-access capability, or if you require Punter protocol, Bobsterm Pro should be at the top of your consideration list—it's a program I wouldn't hesitate to recommend to C-128 computerists. *(Progressive Peripherals & Software, 464 Kalamath St., Denver, CO 80204. C-128/$79.95 disk.)*

Jim Grubbs
Springfield, IL

Checks & Balances

Let Your Computer Keep Your Finances In Good Order

Nearly everyone who owns a personal computer has tried running a checkbook-balancing program at one time or another. Many of these programs end up collecting dust because it's easier to balance a checkbook by hand or with the aid of a calculator than to repeatedly fire up the computer, warm up the monitor and rummage for the data disk.

However, Checks & Balances, a

DO YOU LOOK GOOD ON PAPER?

Once you load Fontpack 1 into your GEOS-equipped Commodore, your papers are never the same.

You see, Fontpack 1 lets you feel mean and nasty. OR MYSTICAL. Or calm AND GENTLE and good. And it's great for those times you're feeling *absolutely childish.*

But sometimes you have **important things** on your mind. **Like money.** So Fontpack 1 comes with a total of **20 styles** that work with your GEOS system.

You see, with Fontpack 1, you're not just writing a statement; you're MAKING A STATEMENT about your writing.

So if you want your papers to make you look good, follow these simple **words of wisdom:**

Buy Font Pack 1. or else,

A Friend.

To order call
1-800-443-0100 ext. 234
Fontpack 1 $29.95
(California residents add 6.5% sales tax.)
$2.50 US/$5.50 Foreign for shipping and handling. Allow six weeks for delivery.
Commodore is a trademark of Commodore Electronics, Ltd. GEOS, Fontpack 1 and Berkeley Softworks are tradenames of Berkeley Softworks.

FONTPACK 1

Berkeley Softworks

The brightest minds are working at Berkeley.

CP/M program for the C-128, takes this timeworn theme and expands on it. It lets you categorize your income and expenses and generate totals and reports.

There can be up to 64 defined categories and an unlimited number of undefined categories. You can divide individual entries among up to four categories, and you can attach a 38-character memo to each entry. This lets you find any transaction using check number, category, payee or memo.

The program includes features for displaying and editing transactions, reconciling your bank statements, paying your bills, and printing reports and checks.

Checks & Balances consists of three disks containing the main program, overlays and sample data files. The software is not copy-protected. The 170-page manual guides you through basic program operations and explains the advanced features.

The program is designed to run with an 80-column monitor and two disk drives, although it can run with one physical drive plus a hard disk or a RAM disk.

Checks & Balances is command-driven, but a help screen is only a few keystrokes away. Once you've gotten used to the program, moving about is faster without menus.

After making copies of the original disks, the first thing to do is set up a checkbook. This entails figuring out what categories you want to keep track of. One nice feature of Checks & Balances is its ability to add or change categories at any time. Another worthy feature is that all transactions—deposits, checks, service charges, and so forth—are entered with the same command.

I was particularly impressed by the provision to enter information for bills as you receive them, and later to pay them using the Bills command. This really gives you a good idea of what you owe and when you have to pay it.

As you check off all uncleared transactions with the Balance command, the program displays a running bank balance that's separate from the true balance, which includes all deposits and checks written since the date of the bank statement.

Checks & Balances also lets you display and edit your checkbook in a variety of ways. You can display all transactions for a particular category, a particular character string or over a selected period of time. An extensive list of commands allows reports to be printed for the entire checkbook or for any part of it. The program will also print your checks on special continuous-feed, sprocketed forms. When used with the program's Rolodex feature, the checks can be printed with the payee's name and address in position to show through the window of an envelope.

The manufacturer, CDE, has a no-nonsense support policy. If you call with a problem, they will expect you to be at your computer, prepared to give a detailed description of your system and the nature of the problem.

What makes Checks & Balances useful is that it goes beyond a mere checkbook program. It's more a financial management program suitable for personal and small-business use. *(CDE Software, 948 Tularosa Drive, Los Angeles, CA 90026. C-128/$74.95 disk.)*

Alex Lane
Jacksonville, FL

Paper Models: The Christmas Kit

Start Now to Personalize Your 1987 Holiday Season!

Christmas used to be a holiday that inspired family participation. From chopping down the evergreen tree, to threading strings of popcorn, to hanging candy canes and homemade gingerbread men, every age group contributed.

Now, however, Christmas tends to come pre-packaged. Artificial trees and plastic decorations from the store are assembled within 15 minutes. The final effect may be the same as in times gone by, but so much of what went into creating that effect is missing.

Activision's Paper Models: The Christmas Kit attempts to restore some of what is missing from this special holiday. The result, ironically, is a piece of modern computer software technology that delivers a healthy helping of old-fashioned Christmas spirit.

This disk-based program is very much what its title suggests: It contains the software and most of the tools needed to create, with the help of a Commodore computer, Christmas ornaments, gift boxes and decorations.

The software operates in much the same way as Broderbund's Print Shop. A few simple commands let you first choose a blueprint for a particular paper model, then decorate it, using pictures you've selected from an assortment of holiday clip-art on the disk.

The program lets you use a joystick and/or keyboard to get really imaginative. Its greatest contribution to creativity is the built-in paint program. This feature lets you modify the clip art and designs into entirely new artwork for use on their paper models.

I found two of the paint commands particularly useful. One makes it easy to automatically draw straight lines on artwork, and the other zooms in on a tiny section to let you fill in a given area, pixel by pixel.

Paper Models: The Christmas Kit is menu-driven and very easy to use. Commands are executed by hitting a single letter representing the function to be performed. Artwork is manipulated using cursor keys or a joystick to move cross hairs or intersecting lines around the screen.

The program encourages users to combine computer technology with arts-and-crafts elbow grease. Once you've used your Commodore to create and decorate the models, you must apply skills you may not have used since kindergarten to finish them. After printing out a decorated blueprint, you cut it out and paste it on card stock. Then, after coloring, you fold and glue it where indicated on the blueprint.

To get things rolling as quickly as possible, Activision even includes a starter kit—a glue stick, ten sheets of heavy card stock, red and green felt-tip pens, a small plastic ruler and five tiny bells.

There are a few things that could have made this program better, however. It would benefit from a utility for shrinking or enlarging the size of any piece of clip art, since some of the art that's provided simply won't fit the

model blueprints. It would also help if some of the clip art could be flipped or turned around, and I'd like a larger selection of art to choose from.

On the other hand, it's hard to complain about a program that combines modern technology and traditional craftsmanship into a package that's both useful and fun to use. Just think, if you start now, you'll have 12 months' worth of creativity on your tree next Christmas! *(Activision, Inc., 2350 Bayshore Parkway, Mountain View, CA 94039. C-64/$24.95 disk.)*

Scott Wasser
Wilkes-Barre, PA

Battlefront

A-

Opposing Forces Engage in Famous WWII Battles

Like its previous offerings of Carriers of War and Europe Ablaze, Strategic Studies Group's latest war simulation, Battlefront, lets you recreate historic battles by putting you in command of the WWII forces that fought them.

These new confrontations include the struggle between New Zealand's infantry divisions and German forces for control of key positions on Crete, the Soviet Union's defense against German panzer divisions advancing on Stalingrad, the United States' offensive on the Japanese-held island of Saipan and the conflict between U.S. and German forces over the Belgian city of Bastogne. Battlefront also contains a menu-driven game editor for designing additional settings.

You command either the allied or axis armies, with the opposing forces controlled by another player or the computer. The number of victory points received for controlling specific objectives can be the same for both players, or Battlefront's handicapping menu can be used to give either side a minor or major point advantage without affecting military performance. There is even an Observe mode in which the computer plays both sides of a conflict to let you analyze battles and test original scenarios.

To help plan your strategy, SSG has provided on- and off-screen maps for both players. The maps divide both water and land masses into hundreds of tiny hexagons and show the locations of important military objectives.

Also available to aid armchair generals are reports on the status of each division, descriptions of military objectives, weather forecasts and displays of date and time. This information not only adds realism to the simulation, but also has a direct relation to the success of operations.

As Corps Commander, you must direct military exercises for up to three divisions of 60 battalions organized into regiments. Once both players have issued orders, the computer displays the movement of the forces on the hex map and summarizes the outcome of combat and non-combat activities. A game can take as many as 63 turns to complete, so it's fortunate that you can save up to eight games-in-progress on a formatted disk.

Whether you're a computer war

ART COLLECTOR, EDITOR, TIMEKEEPER & CARD SHARK FOUND STUFFED IN BOX.

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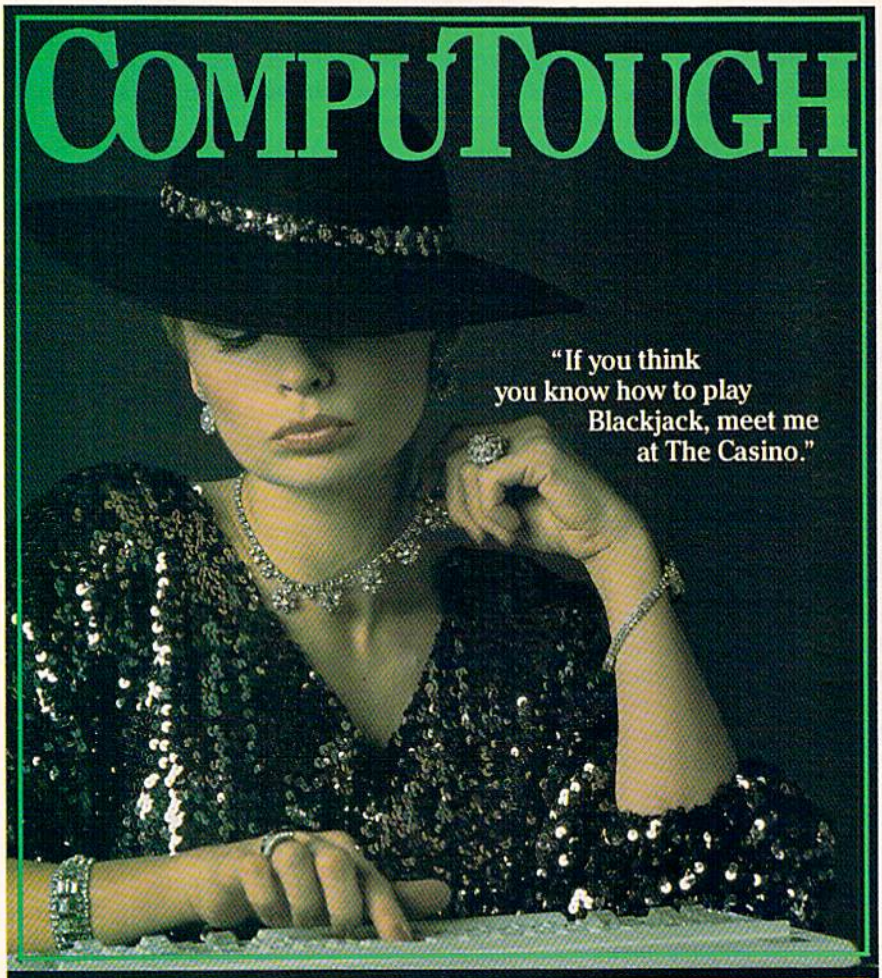
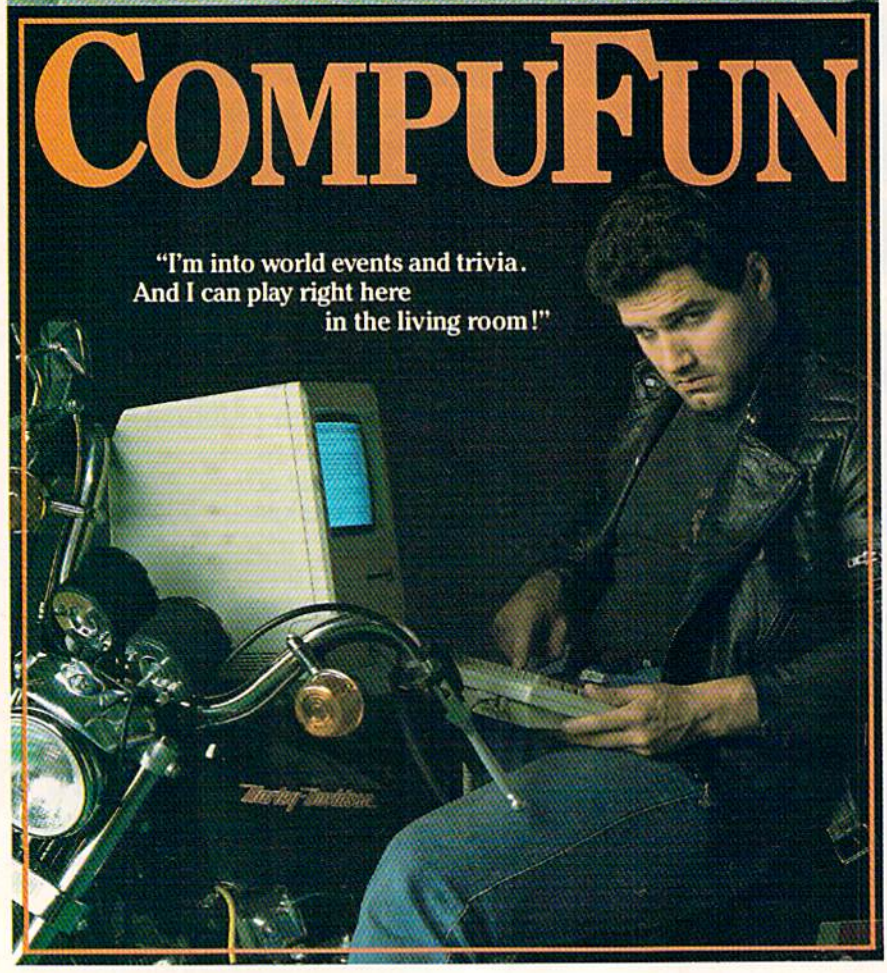




veteran or a new recruit to the war game genre, Battlefront makes it easy to command the military forces that helped decide the outcome of World War II. *(Strategic Studies Group; distributed by Electronic Arts, 1829 Gateway Drive, San Mateo, CA 94404. C-64/ $39.95 disk.)*

Bob Guerra
Charlestown, MA

WordPro 128/S

A

The Search for the Ultimate Word Processor May Stop Here

As with many new computers, the C-128 arrived in a virtual software vacuum. Early programs tended to be rewrites of existing software that didn't always take advantage of the computer's extra memory and speed.

Happily, that's all changed. There's a growing number of powerful packages on the market that will meet the needs of almost any C-128 user.

When it comes to satisfying their need for a word processor, many continue to rely on WordPro. Originally developed for Commodore's early business computers, WordPro was the standard for years. The newest release, WordPro 128/S, is the latest in a long string of significant upgrades and improvements to this durable program.

Operating in the 80-column mode, WordPro 128/S relies on commands you embed within the text to control the format and layout of your printed document. WordPro 128/S is not menu driven: The entire screen is available for text display, and the status line at the top of the monitor provides all the necessary prompts and information.

The back of the program disk contains a 90,000-word dictionary and has room for you to add 10,000 more. Accessible from within the main program, this spelling checker is activated at the touch of a key and returns you to your document when corrections are complete.

You'll probably appreciate the con-

Circle 64 on Reader Service card.

venience of not having to load a separate program in order to switch between text entry and the spelling checker, and you'll be amazed at how fast this function works. After identifying and counting the number of unique words in your document, WordPro 128/S whizzes through its dictionary and highlights questionable words. This spelling checker automatically learns new words and adds them to its dictionary.

Another of WordPro 128/S's strengths is its ability to support proportional printing and to work with a large number of different printers. More than 35 customized printer modules are supplied on the program disk, and WordPro claims compatibility with over 100 printers. A feature known as graphic tabs lets you enter text or figures that will align themselves in columns during printout.

WordPro 128/S will also automatically create a table of contents and an index, or cross reference a document through the use of page referencing. This new release lets you make relative assignments of numerically designated settings like margins, page length, spacing and header positions.

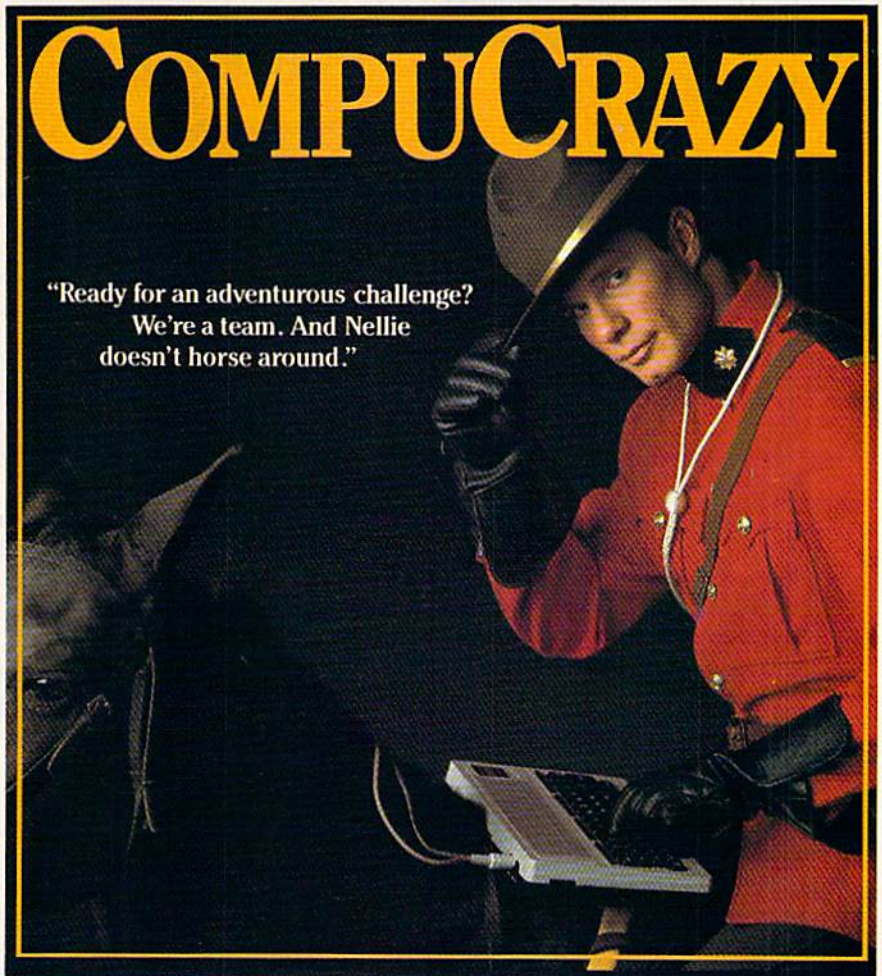
New WordPro users will like the three-command summary screens that pop into a large window with a touch of the help key. If more guidance is needed, the user's manual is well-written and easy to use.

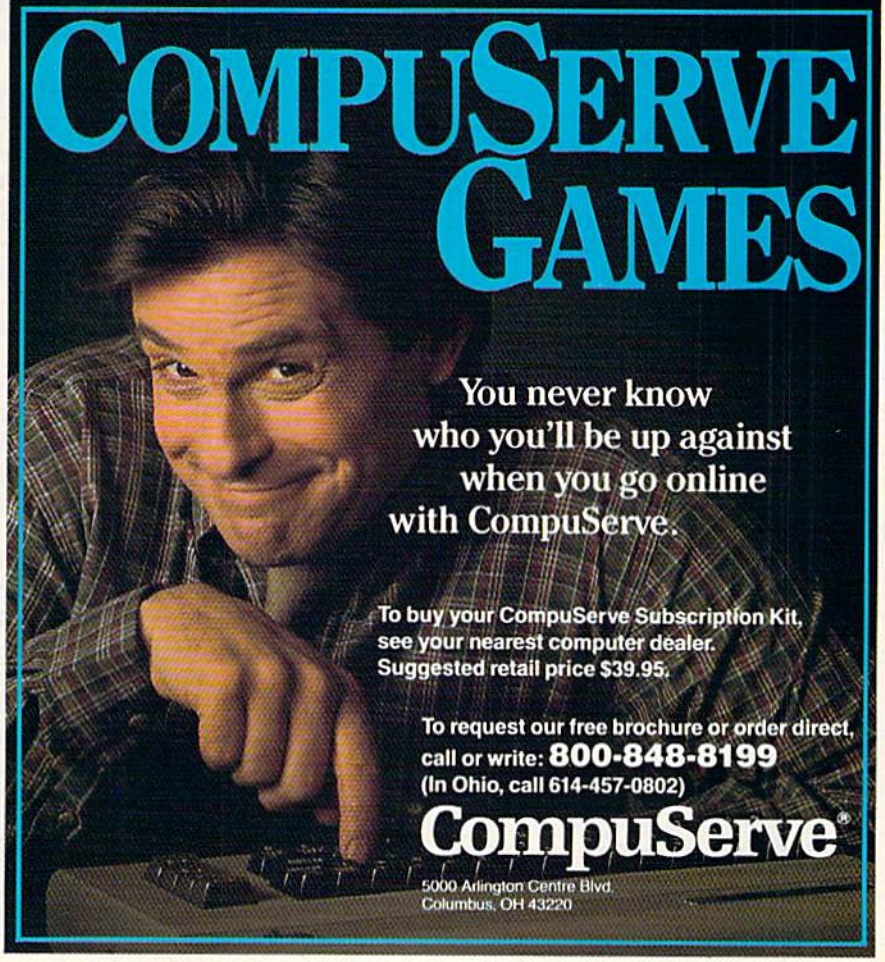
One most convenient feature lets you start printing from any page, so you don't have to print a whole document when you want only one part. WordPro 128/S also offers excellent error trapping: The cursor stops over the offending character and an error message appears on the status line.

WordPro 128/S has several shortcuts for text entry. The multiple Search and Replace function lets you enter abbreviations for frequently used words and later insert the words with a single command.

The program also includes word-wrap and double-column output. Another function alternates pages, allowing text to be printed on both sides of continuous-feed paper.

Of course, WordPro 128/S isn't perfect. While the cursor control is adequate, I prefer full-time logical cursor-movement keys that jump the cursor a word, sentence or paragraph at a time. It would also be nice if the checkmark that precedes all embed-





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Software Gallery

ded commands were generated with one key instead of two.

WordPro has been my personal word processor since it was first released for the C-64. With WordPro 128/S, my reliance on this software will continue unabated. It's a package that merits serious consideration by any user who wants a powerful, full-functioned word processor. *(Available from: Spinnaker Software, One Kendall Square, Cambridge, MA 02139. C-128/ $39.95 for WordPro + FilePro, disk.)*

John Premack
Lexington, MA

Fastfile

C

This Database Might Be Worth a Try for Household Organizers

Fastfile is aimed directly at those computerists who don't have the patience or desire to learn how to use some of the more sophisticated Commodore database programs.

Interactive Mini Systems guarantees that Fastfile is the fastest and the easiest to learn to use of all databases for the C-64 or C-128. That statement is backed by a 15-day, money-back warranty. A close look at Fastfile's manual reveals, however, that the money-back offer (85% refund) is available only from dealers who agree to participate.

Even less obvious is the fact that Fastfile is written for the C-64, although a 128 is featured prominently on the package. I was unable to find a single reference to the C-128 between the covers of the 28-page manual.

You can use Fastfile with ease primarily because it's menu-driven and accompanied by four previously designed record forms. These templates allow novices to quickly feel their way through data entry and recovery. You're also free to start from scratch and use one of the convenient screen-designer worksheets to create your own custom database.

Data access is fast because all records are instantly available from RAM. Fastfile doesn't waste time going to the disk whenever you enter information or search for individual records. However, the fact that an entire database is loaded at once and later saved back to disk is a mixed blessing at best.

On the plus side, you can easily back up datafiles to another disk or save them under a new name to preserve the old file. By infrequently accessing the disk, however, Fastfile places newly entered data in jeopardy of loss to power failures or operator error.

The 36K of RAM set aside for storing data can hold 720 50-byte records. Adequate for most home applications, Fastfile is nonetheless limited in the amount of data it can manage. While you can assign up to 31 fields to each record, there would then be room for fewer than 200 records.

Searches are also lightning fast, but partial string searches are limited to the use of the familiar asterisk for wild-card matches and the question mark for designating a single, unknown character. Also, if any of the data fields used for searches or sorts include numbers, you must enter leading zeroes to ensure that each numeric field contains the same number of digits.

Besides being fast at data entry and retrieval, Fastfile is particularly adept at sorting. For instance, a mailing list that must be frequently updated and sorted by both zip code and member status can be processed instantly as you begin a printout.

Sorts are initiated by entering the numbers of the desired data fields. Unfortunately, Fastfile doesn't offer any prompts for this, so you'll have to either memorize or keep a written note of which numbers go with which fields.

Finally, while the Fastfile disk is unprotected and may be backed up as required, it cannot be run without a dongle, which plugs into the user port. I found the requirement to disconnect my modem and insert the dongle prior to running the program an unnecessary annoyance.

In my opinion, Fastfile is fast and easy to use, but unfortunately, it's also underfeatured and overpriced. *(Interactive Mini Systems, Inc., 5312 W. Tucannon, Kennewick, WA 99336. C-64/ $59.95 disk.)*

John Premack
Lexington, MA

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eyeball to eyeball action. This time around you'll be right in the middle of it all. You knew it wouldn't be pretty. But how tough could it be to rescue a downed pilot?

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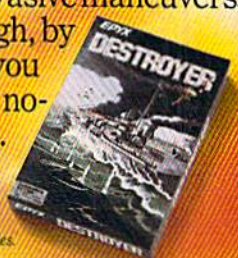
Even though, by experience, you know there's nowhere to run.



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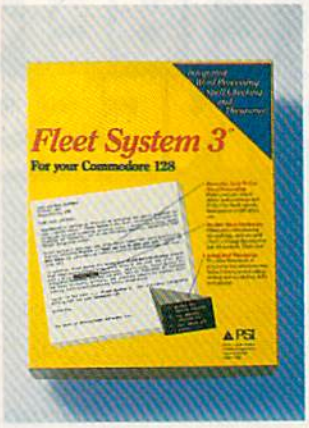

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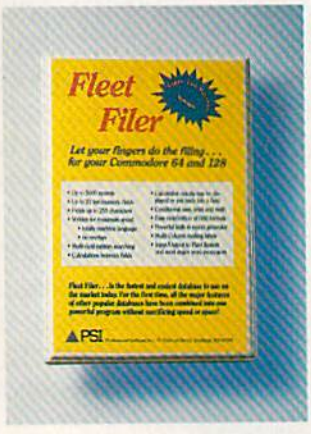

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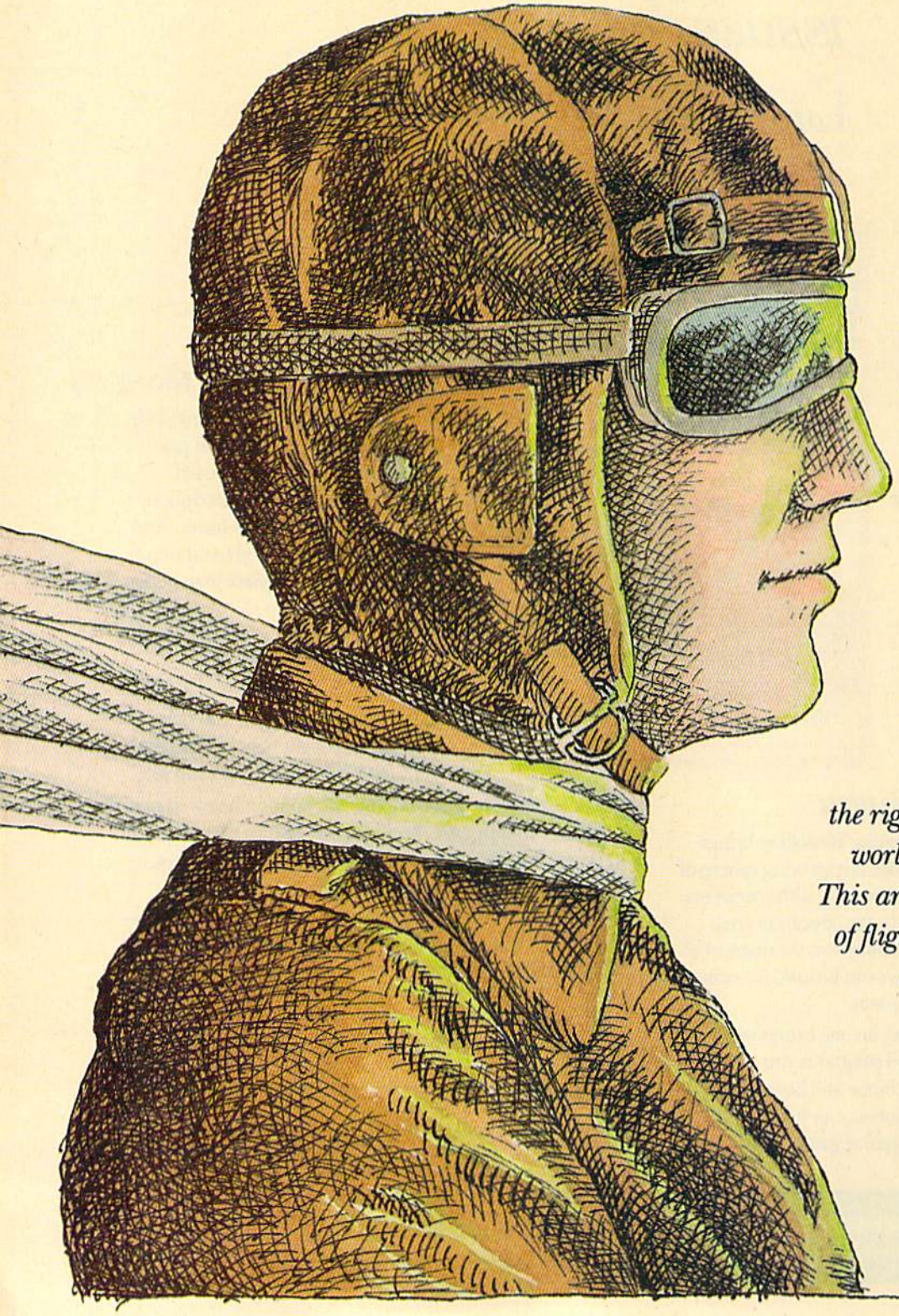


YOU CAN FLY WITH YOUR C-64!

By TIM WALSH

Do you think you have the right stuff to enter the exciting world of aviation on your C-64? This article explores the popularity of flight software and takes a look at some available programs that will and won't fly.

Flight software runs the gamut from four star to forlorn, and thus it should come as no surprise that all flight simulators for the C-64 are not created equal. Some flight simulators are great fun and create the sensation of actually being in the cockpit. However, some highly touted programs don't even come close to simulating flight, lacking crucial flight controls, such as rudders and flaps.

Flight simulators are popular among C-64 users for a variety of reasons. First, some, but certainly not all, are helpful in demonstrating the principles of flight. Second, most are entertaining to use. Finally, the better ones illustrate how the C-64's memory locations can work together in a program, thus giving programmers added insight.

Flight or Fight?

You should not confuse flight simulators with another kind of flight software—combat flight simulators.

True flight simulators create the sensation of flight. They put you in the pilot's seat and go to great lengths to simulate an aircraft's environment. They include most of the standard controls found in light airplanes, and those controls operate fairly realistically.

In combat flight simulators, aircraft bristle with implements of destruction. They usually place equal emphasis on the aircraft's detail, its armament and the enemies bent on destroying you before you destroy them. Some are as likely to put you in the bombardier's seat as in the pilot's seat, and the objective of the game usually can be summed up in two key words—mission and score.

The format of combat flight simulators rarely varies. In most, the goal is to dodge/detect/destroy/rescue some persons/places/things while you drop/shoot/fire a limited/unlimited number of noisy bullets/missiles/bombs at other persons/places/things.

For purposes of this article, I will focus on flight simulators and how you can log some quality flying time on your C-64. The reviews at the end of the article list both combat and non-combative flight simulators.

Simulating Flight

Having used dozens of flight simulators, I've discovered that when software designers create a computer-simulated aircraft, they must adhere to two basic rules of authenticity.

The first rule is related to the fact that an aircraft traveling through the air moves, or rotates, on three axes. The proper names of those rotations are pitch (vertical movement), roll (circular movement) and yaw (side-to-side movement). To attain a sense of realism, a flight simulator must use the computer's graphics to create visually the movement of at least two of the three axes.

The second rule is that scenery and landscapes must change naturally with fluctuations in speed and altitude. To enhance the realism, these changes must occur in synchronization with changes in the three axes.

The C-64's high-resolution screen and fairly rapid data-processing capabilities help create these multiple movements on the screen. With the addition of sound, active instrumentation and proper program operation, the C-64 can create an amazingly lifelike cockpit environment.

(And what about the C-128? According to two executives from top-flight simulator companies, the prospect for C-128 flight simulators is slim. Both company spokesmen stated that their companies have no intention of producing C-128 simulators, but that they are focusing their efforts on producing more and better simulators for the C-64.)

Since the quality of simulated flight is proportional to the quality of a flight simulator's graphics, the more detailed and responsive the graphics are, the better the program.

Flight simulators remove the danger from flight. No matter how high, fast or recklessly you fly, nothing ever gets damaged except an occasional ego. This factor acts as an equalizer among participants. Courage, prowess and brute strength are not prerequisites to becoming a good C-64 pilot. Instead, as in the real world of aviation, a combination of sound reasoning, dexterity and coordination is necessary.

Controlling Flight Simulators

Most flight simulators are controlled both from the keyboard and with a joystick. The keyboard generally is used for basic controls such as flaps, throttle(s) and landing gear, along with more intricate controls

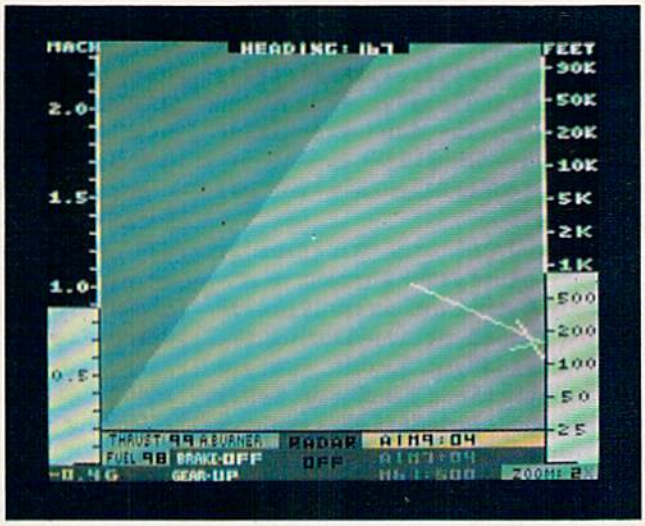
Tim Walsh, (80 Elm St., Peterborough, NH 03458) is RUN*'s technical editor.*

ILLUSTRATED BY MEL FURUKAWA

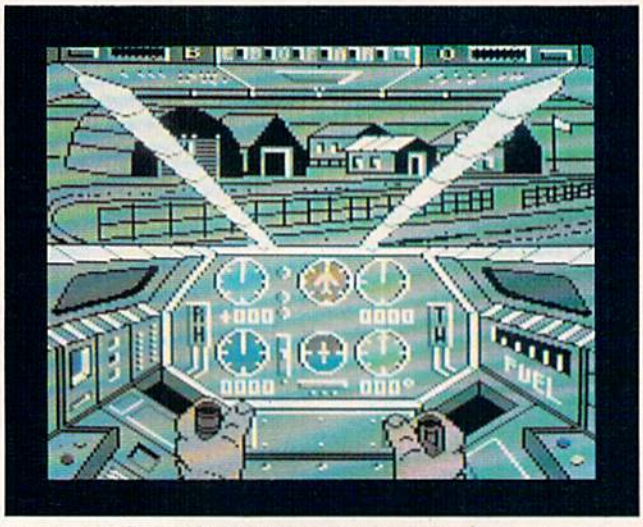
Racing under ribbons with Acrojet, by Microprose.

Taking off with Microprose's Solo Flight.

Demonstrating roll and pitch with SubLogic's Flight Simulator II.

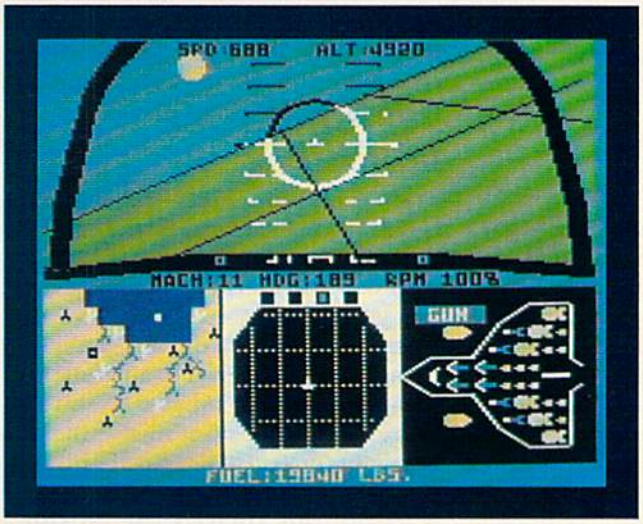


SubLogic's Jet.

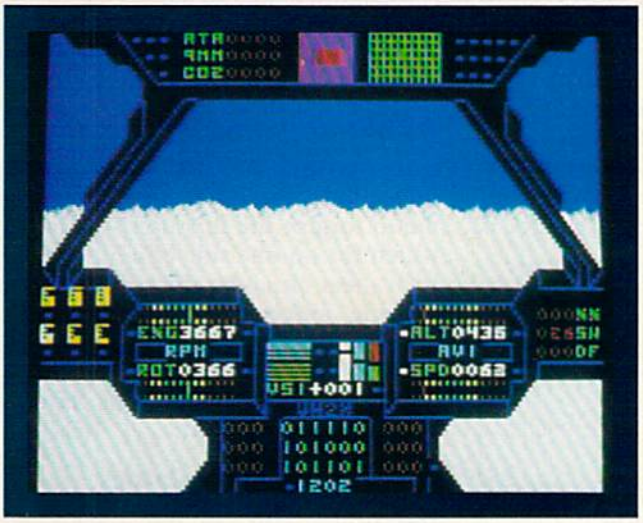


Preparing for take-off with Mindscape's Infiltrator.

In-flight refueling with Spinnaker's A.C.E.



Crossing the line of death in Microprose's F-15 Strike Eagle.



Soaring Cosmi's Super Huey II above the cloud cover.

Bombing run with Accolade's Dam Busters.

such as radar and radios. The joystick is used primarily as the aircraft's control stick.

Although some programs have made joystick control optional, I prefer using a joystick in conjunction with the keyboard. Flight simulators using only keyboard input seem less realistic and are much more difficult to master.

Joystick-controlled flight simulators deserve the best quality joystick you can find. One suggestion is the Flight Simulator II-dedicated Micro-Flyte joystick, reviewed in the November 1986 issue of *RUN*.

Here's a glance at some of the many C-64 flight simulators available.

Acrojet

I reviewed this jewel in *RUN* (November 1986) and consider it the most exciting and intelligently designed flight simulator I have seen for the C-64. It does a terrific job teaching you how to fly. It's a flight simulator that combines flawlessly animated graphics and an instantaneous response to user input. This creates a realistic feeling of flight that is second only to the real thing.

Please let me know if you have found anything better.

Solo Flight

This program combines excellent graphics and speech synthesis to guide you through takeoff, flight and landing. Solo Flight is realistic until you try aerobatics: It doesn't know a barrel roll from an onion roll. This cancels the possibility of fancy aerobatic maneuvers over Seattle, Wichita, Boston or the countless other cities and towns Solo Flight lets you fly from, over and to. It does, however, possess nearly every option needed to learn the principles of flight.

F-15 Strike Eagle

This is a combat flight simulator that has become standard fare for nearly every C-64 game player, complete with a full complement of flight controls. The latest version gives you the opportunity to engage in combat with Libyan fighters.

Real F-15 fighters travel great distances in a short amount of time, so

the scenery graphics used in F-15 Strike Eagle are merely sketchy lines. (Sketchy translates into quick-changing when you're talking C-64 graphics.) If you enjoy the kind of thrills offered by this program, however, you probably won't mind the graphics one bit.

Top Gunner

Longtime VIC-20 users will fly back to familiar territory with the two combat flight simulators found on this disk. Also included is an unsophisticated, but very entertaining, helicopter program that doesn't pretend to be anything more than an arcade game.

Flight Simulator II

I place Flight Simulator II near the top of the heap because it has a nearly perfect level of technical accuracy. Despite its complicated operation and inferior graphics, this program's flawless navigational aids, along with its amazing accuracy and detail in the instruments and controls, make it a serious package for learning how to fly. Flight charts, a 94-page operating handbook and a 92-page flight physics handbook are included in the package. You also can use the SubLogic scenery disks with it.

Jet

This keyboard-intensive, combat flight simulator for the C-64 is, in most respects, a good package. Jet allows you to make land- or aircraft carrier-based launches and landings and to shoot down enemy planes. But be forewarned: This is a difficult flight simulator to use and requires a lot of practice.

Technically, Jet is finely detailed, but the instrumentation is disappointing. The program is compatible with SubLogic scenery disks, along with the Flight Simulator II disk.

Super Huey II

This superbly designed helicopter flight simulator lets you conduct combat, rescue, fire-fighting and weather-reconnaissance missions. The layout of the many controls and gauges is almost perfect, and the animated graphics are above par. This is an exciting, must-have software item for flight simulator aficionados.

Infiltrator

Every time you use Infiltrator, you're required to fly a sophisticated, combat-equipped helicopter. The controls demand constant attention, and the graphics are excellent, but the program does have drawbacks.

Infiltrator is geared to an audience that has outgrown mindless Saturday morning cartoons but misses the excitement they once provided. Infiltrator tries to preserve that excitement with options such as the "turbo" mode (Mindscape calls it the "Whiz-bang Whopper" turbo mode), which allows you to accelerate to 900 (or was it 9000?) knots. Unfortunately, a sense of realism is sacrificed in the process.

A.C.E.

I like to think A.C.E. was developed on Fantasy Island. That thought helps me to forgive the tiny user's manual, which fits on one side of a 5½- by 7½-inch sheet of paper; the you-gotta-be-kidding air/ground combat action; and the weird, in-flight refueling. It also would explain why the garbled synthesized speech warnings have a Polynesian-like accent.

Five Combat Simulators

U.S.A.A.F., Wings of War, Eagles, 50 Mission Crush and Fighter Command—the Battle of Britain are combat flight simulators that allow you to reenact historical WWI or WWII events. Or, if you prefer, you can bomb your favorite British or German city. The games have relatively few graphics beyond maps, with the exception of WWI-based Eagles, which combines six-character patterns to represent biplanes.

What these programs lack in graphics sophistication, they partially compensate for in educational value. Imaginative high school history teachers could put together some exciting classes with this software.

Spitfire 40

Spitfire 40 puts you behind the controls of a WWII British Spitfire com-

List of Manufacturers, Products and Prices.

Ace of Aces, $29.95
Dam Busters, $29.95
Accolade, Inc.
20833 Stevens Creek Blvd.
Cupertino, CA 95014

Gulf Strike, $30
Spitfire 40, $35
Avalon Hill Microcomputer Games
4517 Harford Road
Baltimore, MD 21214

Super Huey II, $24.95
Cosmi, Inc.
415 N. Figueroa
Wilmington, CA 90744

AcroJet, $34.95
F-15 Strike Eagle, $34.95
Kennedy Approach, $34.95
Solo Flight, $34.95
Top Gunner, $24.95
MicroProse
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Hunt Valley, MD 21030

Infiltrator, $24.95
Mindscape
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Northbrook, IL 60062

Stunt Flyer, $24.95
Sierra On-Line
48677 Victoria Lane
Oakhurst, CA 94644

A.C.E., $24.99
Spinnaker Software/UXB Div.
1 Kendall Square
Cambridge, MA 02139

U.S.A.A.F., $59.95
Wings of War, $39.95
Eagles, $14.95
50 Mission Crush, $39.95
Fighter Command—The Battle of Britain, $59.95
Strategic Simulations, Inc.
1046 N. Rengstorff Ave.
Mountain View, CA 94043

Flight Simulator II, $49.95
Jet, $39.95
SubLogic Corp.
713 Edgebrook Drive
Champaign, IL 61820

bat simulator. The goal is to shoot down German aircraft as they appear. It lacks the sense of flight that the better flight simulators offer, but the primary object of Spitfire 40 is to rack up points.

Stunt Flyer

Learning aircraft aerobatics is a lot easier if you can see an airplane perform the aerobatic maneuver you want to try. Unfortunately, this is the only truly impressive option in Stunt Flyer.

I feel disoriented in Stunt Flyer's cockpit. Large, blocky graphics, which lack accurate detail and are choppy in operation, leave me wondering whether I'm upright, inverted or about to crash. On the plus side, you get to see a replay of your flight when it's done. I have found watching Stunt Flyer's sprite tracing aerobatic movements to be far more enlightening than trying to fly the plane.

Ace of Aces and Dam Busters

With these two WWII combat flight simulators, you can wage war over Europe during WWII. Ace of Aces lets you pilot a Mosquito fighter/bomber, while Dam Busters puts you in a Lancaster bomber. Surprisingly, graphics and overall detailing in both packages are above average. As combat simulators go, they are challenging, exciting and fairly realistic. As flight simulators, however, they are lumbering and somewhat unresponsive—just what you'd expect from a real bomber.

Gulf Strike

Don't be fooled by the ads for this program. I thought it was a flight simulator for the C-64 right up until the time I tried it. Then I found out that it's only a sophisticated, computerized equivalent of the Battleship game we all played as kids. Consider yourself warned.

Kennedy Approach

Although this is not a flight simulator, it does put you in the air traffic controller's seat, as you guide planes in for a landing. You'll find that it's equipped with both synthesized speech and plenty of excitement.■

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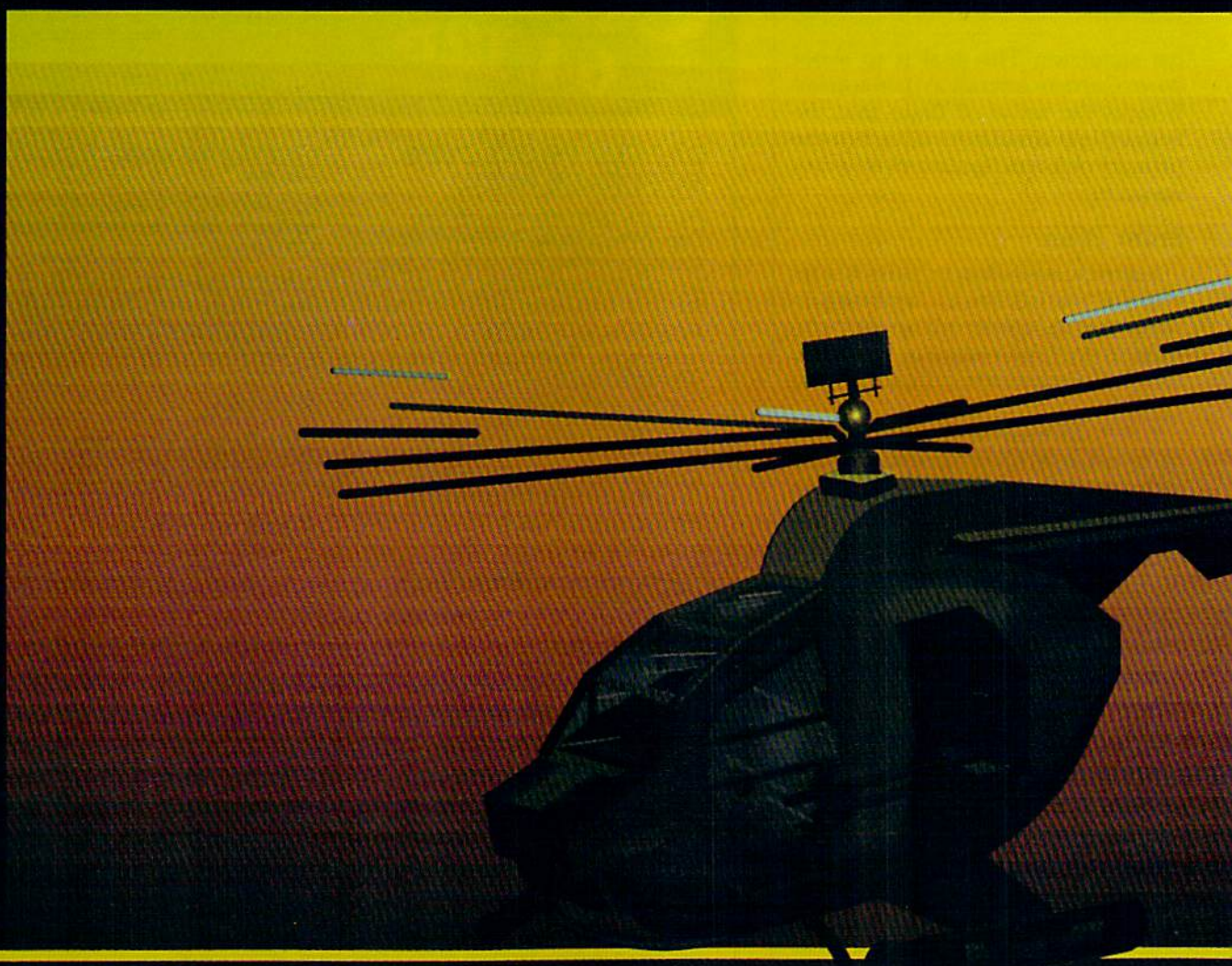
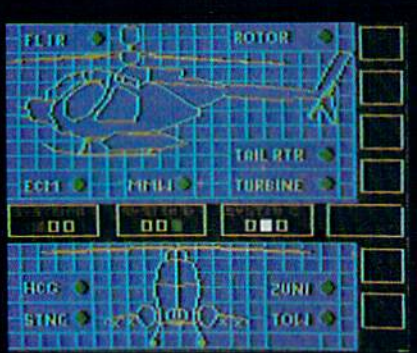
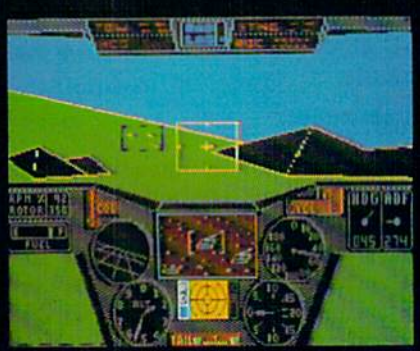


In a market full of helicopter simulations like Super Huey II, Gunship, and Infiltrator, it's nice to find a product like ThunderChopper that flies high above the rest!

Colonel Jack Rosenow USAF (Ret.), President of ActionSoft Corp., has the experience to provide all of the helicopter action and strategy you've been looking for! ThunderChopper incorporates the most advanced graphics, flight systems, and game-playing factors to provide a sensational balance of strategy and fun:



- Action-packed animated graphics include real 3D scenery and airborne threats. The competition's graphics just don't compare.
- A sophisticated instrument panel lets you scan all vital information at a glance whether performing combat, exploration or rescue operations. ThunderChopper's advanced instrumentation includes Forward-Looking Infra red, CO2 laser radar, zoom television, and ECM. Armament includes TOW and Stinger missiles, a Hughes Chain Gun, and Zuni rockets.
- Better program and documentation design gets you up flying exciting combat missions in minutes.



As Colonel Jack says: "ThunderChopper is the ultimate in helicopter action and realism. Nothing else even comes close. No other simulation can boast this much fun!"

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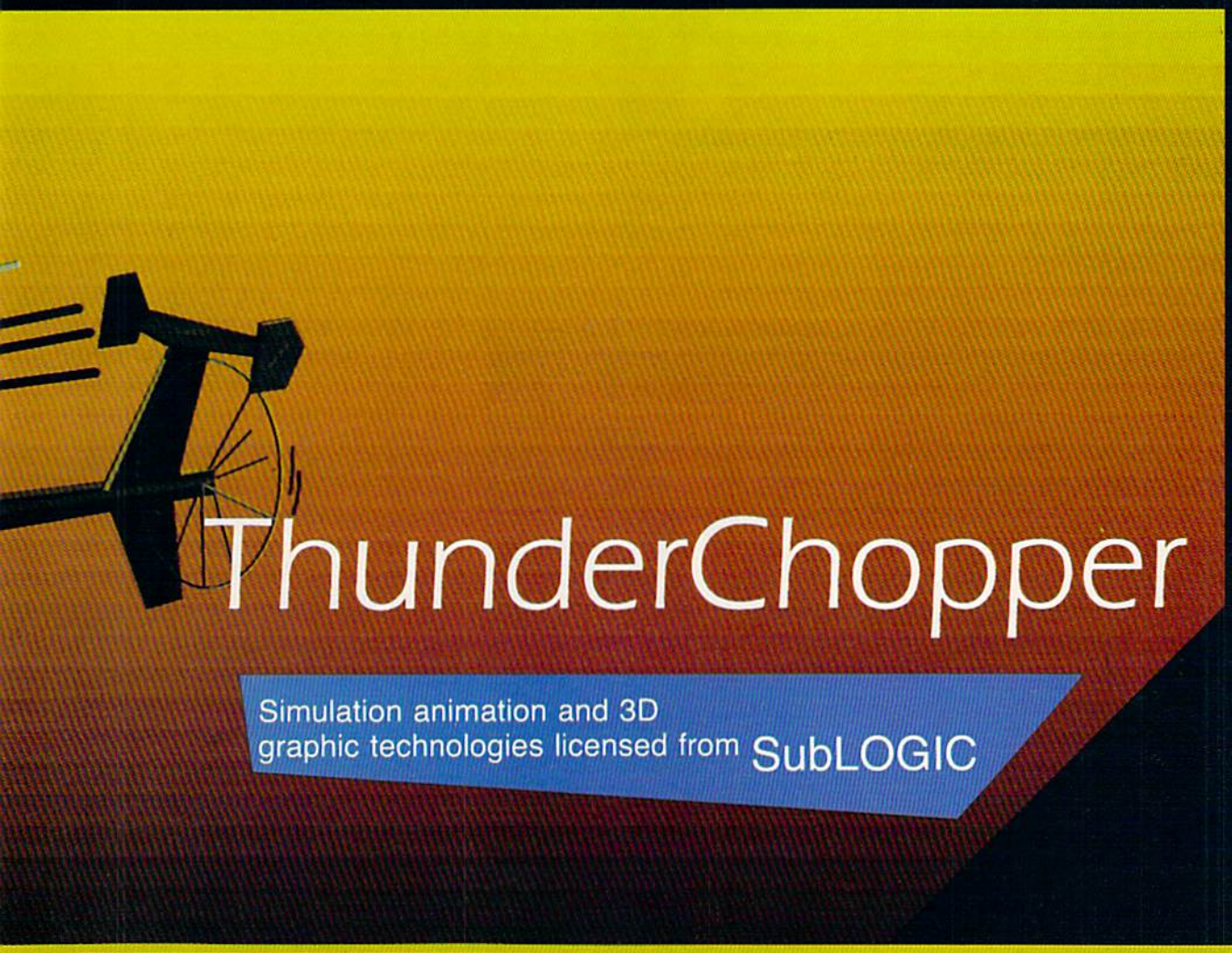

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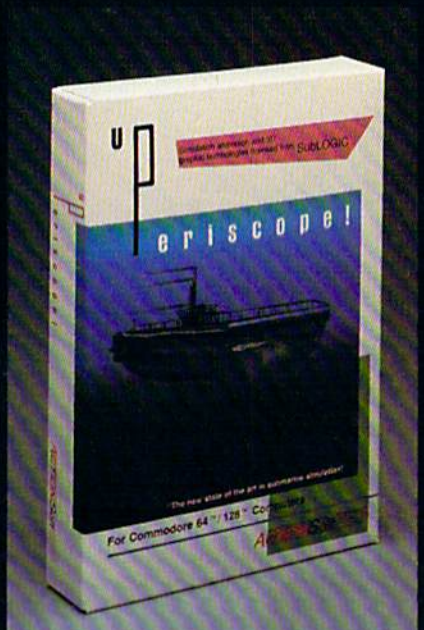

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HOOK UP TO A PORTABLE

For dedicated C-64 owners who need the portability of a Radio Shack Model 100, this program's for you.

By HOWARD PARNES

Radio Shack's Model 100 linked to a 64C.

I am sure that many dedicated Commodore users have been itching for Commodore to introduce a small, battery-operated portable computer that would be compatible with the C-64. Commodore's model SX-64 is an excellent "trans-portable," but it requires an electrical outlet to operate. Now C-64 users who also own a Radio Shack Model 100 can have Commodore portability.

I've written a machine language program that "creates" a portable, battery-operated Commodore by linking a C-64 and Radio Shack Model 100. Called the Model 100 & 64 program, it allows you to create text files on the Model 100, then transfer the files to the C-64 and save them on disk. Later, you can reload the files using one of the popular word processing programs for the C-64.

The two devices can communicate over telephone lines, or they can be linked directly. The only accessory necessary is a modem for the C-64; the Model 100 has its own built-in, 300-baud modem and software.

The Model 100's text editor operates like most word processing programs for the C-64. It offers most of the conventional block moves, along with search, text editing and cursor movement features. Using the 100 & 64 program, you can easily emulate the standard Commodore word processors on the Model 100, then upload your text files to the C-64.

Setting Up

You must load *RUN*'s ML Perfect Typist program (see the December 1986 issue of *RUN* or the November-

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December ReRUN) into the C-64 before typing in the 100 & 64 program. Then save the latter to disk before running it.

After you type RUN, you must specify the type of modem you're using with the C-64—a 1650 or a 1660/300. The program will set the appropriate parameters. If you're using a 1650-type modem, remember to set the originate/answer switch to originate, the half/full duplex switch to full and the telephone/line switch to line. With a 1660/300 type modem, you need only set the originate/answer switch to originate.

On the Model 100, you must set the originate/answer switch to answer and the communication status to M8N1D. The M stands for modem, the 8 for a word length of eight bits, the N for no parity and the 1 for one stop bit. The D disables the Xoff status.

Once you set the communication status on the Model 100, it's held in memory until you switch it to something else. Also set duplex on the Model 100 at full (which becomes the default). If you're communicating by phone, set the C-64's modem to originate and the 100's to answer, regardless of who makes the call.

Communicating

After you've set up the machines, load and run the 100 & 64 program on the C-64 and select the modem program on the Model 100. You're now ready to communicate between machines by typing in your message. All direct correspondence is printed on the screen of each computer. My program doesn't include a blinking cursor, but this shouldn't be much of a problem.

In addition to direct correspondence, a file can be sent from the Model 100 to the Commodore, then saved on disk. Pressing F1 on the 64 clears the screen and displays the following options:

1. Return to terminal mode
2. Download screen code file
3. Download CBM ASCII file
4. Download Basic file
5. Quit

Selecting option 1 returns you to direct communication, while option 5 terminates the program. Options 2, 3 and 4 let you transfer one of the three types of files. When you select one of these options, the screen on the 64 clears, and a Ready message is displayed. A message also appears on the Model 100 to indicate the type of file the C-64 is expecting.

To transfer files from the Model 100, first press the F3 key for the Upload mode, as displayed on the label line. Then type in the name of the file to transfer. When the program

A typical setup of the Model 100 with the 64C.

asks for the width, press the return key. Setting the width is important for transferring to some devices, but no setting is necessary for the C-64.

Transfer now begins and is indicated on the Model 100 by the Up label changing to reverse video. When the Up label changes back to normal, the transfer is complete.

When a Basic file is transferred to the 64, the file appears on the 64's screen and also goes into memory. Screen code and CBM ASCII files are placed in RAM but are not displayed.

After the transfer, the screen on the 64 clears, and you are asked to enter a filename. Then the program saves the file to disk. Make sure you're not duplicating an existing filename, or the save won't work. When the save is done, the menu reappears.

The C-64 expects a start-and-stop flag from the Model 100 to indicate the beginning and end of the file. This flag is equal to a byte with all bits on—a CHR$(255). You enter a CHR$(255) on the Model 100 by holding down the shift and GRPH keys while pressing the C key. This produces a shaded block similar to the graphics character you get on the 64 by pressing the Commodore key and the plus sign simultaneously.

With a Basic program, you send this code manually before pressing F3 to upload the file and again after the transfer is finished. When transferring a screen code or CBM ASCII file, however, it's easier to put the flag right in the text as the first and last characters in the file. The Model 100's text editor lets you do this using the procedure described above.

Screen Code Emulation

It's easy to enter text on the Model 100 to emulate either CBM ASCII or a word processor that uses screen codes. Regular text is typed in as usual; the only change occurs when you want to enter a nonprinting command. With most CBM ASCII and screen code files, you do this with a series of keystrokes that makes the characters you type appear in reverse video on the screen.

To emulate this with the Model 100, hold down the CTRL key and press the P key twice, then enter the character you want to appear in reverse video. The character won't appear in reverse on the Model 100's screen, but it will be preceded by an up arrow (^) and a capital P. This symbol is quite easy to spot on the Model 100, and the procedure closely follows the pattern for entering commands with both CBM ASCII and screen code programs.

When the C-64 receives this pattern through the 100 & 64 program, the program converts it to the proper code for the type of word processor you specified. For example, when using Easy Script (a typical CBM ASCII word processing program), you press F3, which appears on the screen as a reverse asterisk, before most format commands. To set the left margin, you press F3, then type lm and the value for the left margin.

To emulate this on the Model 100, hold down the CTRL key and press the P key twice, then type lm. On the screen you'll see an up arrow, a capital P and the lm. Then enter the value for the left margin, as with Easy Script. In this manner, you can enter all the commands used in either CBM ASCII or screen code word processing programs.

In addition to emulating Easy Script and most screen code programs, the 100 & 64 program can emulate any word processing program for the 64 that's compatible with either of these. Screen code files are saved as program files using screen codes with a carriage return having the value CHR$(31). CBM ASCII files are saved as sequential files using the regular Commodore ASCII codes. You define the characters for the commands that will appear in reverse on the screen by preceding them with the value CHR$(128).

Thus, you can use the Model 100 with the 100 & 64 program to emulate any word processing program that is compatible with either of these systems.

Remember that Basic programs are transferred and saved as Commodore ASCII sequential files, so you must convert these to regular tokenized Basic programs. The Tokenizer program on page 78 of the June 1986 issue of *RUN* will do the trick for you.

If you need a portable, battery-operated Commodore, I think you'll find the Radio Shack Model 100 one of the most useful peripherals for your computer system. R

Address all author correspondence to Howard Parnes, 115 Chestnut St., Frostburg, MD 21532.

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Listing 1. *Model 100 & 64 data transfer program.*

```
0001 01 08 0C 08 B4 00 9E 32 30 36 38 40 02
0002 3A 00 12 08 BE 00 80 00 00 00 A9 3D 02
0003 02 A2 02 A0 FF 20 BA FF A9 01 A2 6D 05
0004 4D A0 09 20 BD FF 20 C0 FF A9 93 F1 05
0005 20 D2 FF A9 0E 20 D2 FF A9 08 20 6F 05
0006 D2 FF A0 00 B9 D9 0D F0 07 20 D2 FF 05
0007 FF C8 4C 3A 08 20 E4 FF F0 FB C9 13 07
0008 31 F0 14 C9 32 D0 F3 AD 03 DD 09 91 05
0009 20 8D 03 DD AD 01 DD 29 DF 8D 01 B7 04
0010 DD A9 93 20 D2 FF A2 02 20 C6 FF 9D 06
0011 20 E4 FF C9 00 D0 0B 20 CC FF 20 BD 05
0012 E4 FF F0 EC 4C AD 08 A8 A2 02 20 38 06
0013 C9 FF 98 20 D2 FF 20 CC FF 98 20 01 07
0014 CA 08 C9 0D D0 13 20 D2 FF A2 02 2E 05
0015 20 C9 FF A9 0A 20 D2 FF 20 CC FF 86 06
0016 4C 68 08 20 D2 FF 4C 68 08 C9 85 C7 04
0017 D0 03 4C 4E 09 20 D2 FF 20 FA 08 9A 04
0018 A8 A2 02 20 C9 FF 98 20 D2 FF 20 EF 05
0019 CC FF 4C 68 08 C9 0D D0 01 60 C9 6A 05
0020 20 B0 03 A9 20 60 C9 41 B0 01 60 2B 04
0021 C9 5B B0 04 18 69 80 60 C9 60 B0 27 05
0022 01 60 C9 7B B0 04 38 E9 20 60 C9 D9 04
0023 7F F0 03 A9 20 60 A9 14 60 C9 20 B8 04
0024 B0 22 C9 14 F0 0B C9 0D F0 0A C9 5B 05
0025 0A F0 02 A9 20 60 A9 7F 60 A8 A2 10 05
0026 02 20 C9 FF 98 20 D2 FF 20 CC FF 78 06
0027 A9 0A 60 C9 41 B0 01 60 C9 5B B0 1D 05
0028 04 18 69 20 60 C9 5E B0 01 60 C9 22 04
0029 C0 B0 0C C9 8D D0 05 A9 0D 4C 10 D6 04
0030 09 A9 20 60 C9 DB B0 04 38 E9 80 49 05
0031 60 A9 20 60 06 20 CC FF A0 00 B9 F2 04
0032 C9 0B F0 07 20 D2 FF C8 4C 53 09 4C 05
0033 20 E4 FF F0 FB C9 31 D0 08 A9 93 1D 07
0034 20 D2 FF 4C 68 08 C9 32 D0 03 4C E9 04
0035 CA 09 C9 33 D0 03 4C 4F 0A C9 34 67 04
0036 F0 0D C9 35 D0 D9 AD 01 DD 09 20 7C 05
0037 8D 01 DD 60 A9 93 20 D2 FF 20 C9 06 06
0038 0A 20 D6 0A A2 02 20 C6 FF 20 13 EC 03
0039 0B 20 CF FF F0 FB C9 FF F0 1C C9 A8 07
0040 0A F0 F3 C9 0D F0 08 C9 20 90 EB 47 06
0041 C9 7B B0 E7 20 CA 08 20 1B 0B 20 5C 04
0042 D2 FF 4C A2 09 4C 90 0A A9 93 20 34 05
0043 D2 FF 20 C9 0A 20 1A 0D A9 00 20 FF 03
0044 1B 0B A9 25 20 1B 0B A2 02 20 C6 F0 02
0045 FF 20 13 0B 20 CF FF F0 FB C9 FF 0B 07
0046 F0 26 C9 0A F0 F3 C9 10 D0 08 A2 4D 06
0047 01 8E 9D 0C 4C E7 09 20 9E 0C A2 0F 04
0048 01 EC 9D 0C D0 06 CE 9D 0C 18 69 94 04
0049 80 20 1B 0B 4C E7 09 20 26 0B 88 0C 03
0050 A9 2C 99 C3 0D C8 A9 50 99 C3 0D 9A 05
0051 C8 A9 2C 99 C3 0D C8 A9 57 99 C3 5D 06
0052 0D C8 98 A2 C3 A0 0D 20 BD FF A9 38 06
0053 03 A2 08 A0 01 20 BA FF 20 C0 FF 3B 05
0054 20 78 0B 20 9C 0B 4C 4E 09 A9 93 7F 03
0055 20 D2 FF 20 C9 0A 20 6F 0D A2 02 5B 04
0056 20 C6 FF 20 13 0B 20 CF FF F0 FB 34 06
0057 C9 FF F0 25 C9 0A F0 F3 C9 0D F0 92 07
0058 17 C9 10 D0 08 A9 80 20 1B 0B 4C BD 03
0059 62 0A C9 20 90 DF C9 7B B0 DB 20 EE 05
0060 CA 08 20 1B 0B 4C 62 0A 20 26 0B 5D 02
0061 88 A9 2C 99 C3 0D C8 A9 53 99 C3 23 06
0062 0D C8 A9 2C 99 C3 0D C8 A9 57 99 B2 05
0063 C3 0D C8 98 A2 C3 A0 0D 20 BD FF 5D 06
0064 A9 03 A2 08 A0 01 20 BA FF 20 C0 F0 04
0065 FF 20 78 0B 20 9C 0B 4C 4E 09 A9 F6 03
0066 00 85 FB 85 FD A9 25 85 FC 85 FE 16 07
0067 60 20 CC FF A0 00 B9 6F 0C F0 07 59 05
0068 20 D2 FF C8 4C DB 0A A2 02 20 C9 BB 05
0069 FF A0 00 8C D8 0D AC D8 0D B9 6F 0E 06
0070 0C F0 0C 20 FA 08 20 D2 FF EE D8 27 06
0071 0D 4C F1 0A A2 02 20 C9 FF A9 0A DA 04
0072 20 D2 FF 20 CC FF 60 20 CF FF C9 3B 07
0073 FF D0 F9 60 A0 00 91 FB E6 FB D0 4E 08
0074 02 E6 FC 60 20 CC FF A0 00 B9 81 53 06
0075 0C F0 07 20 D2 FF C8 4C 2B 0B A0 29 05
0076 00 A9 00 99 C3 0D C8 C0 16 D0 F8 C4 05
0077 A0 00 20 CF FF C0 11 F0 04 99 C3 FC 05
0078 0D C8 C9 0D D0 F1 60 A0 00 B9 C3 36 06
0079 0D F0 04 C8 4C 57 0B A9 2C 99 C3 F7 04
0080 0D C8 A9 53 99 C3 0D C8 A9 2C 99 C0 05
0081 C3 0D C8 A9 57 99 C3 0D 60 A2 03 57 05
0082 20 C9 FF A0 00 B1 FD 20 D2 FF E6 5F 07
0083 FD D0 02 E6 FE A6 FD E4 FB D0 EF 47 09
0084 A6 FE E4 FC D0 E9 A9 03 20 C3 FF 1F 08
0085 60 20 CC FF A0 00 B9 D8 0C F0 07 D4 05
0086 20 D2 FF C8 4C A1 0B A2 02 20 C9 94 05
0087 FF A0 00 B9 0B 0D F0 0A 20 D2 FF B2 05
0088 C8 4C B4 0B 20 CC FF 20 E4 FF F0 09 07
0089 FB 60 93 0D 0D 0D 1D 1D 1D 1D 1D FF 02
0090 1D 1D 1D 12 D3 45 4C 45 43 54 3A 3D 03
0091 0D 0D 0D 1D 1D 1D 1D 1D 12 31 92 E8 01
0092 20 D2 45 54 55 52 4E 20 54 4F 20 BF 03
0093 54 45 52 4D 49 4E 41 4C 0D 0D 1D F0 02
0094 1D 1D 1D 1D 12 32 92 20 C4 4F 57 32 03
0095 4E 4C 4F 41 44 20 D3 43 52 45 45 DF 03
0096 4E 20 C3 4F 44 45 20 46 49 4C 45 A9 03
0097 0D 0D 1D 1D 1D 1D 1D 12 33 92 20 03 02
0098 C4 4F 57 4E 4C 4F 41 44 20 C3 C2 DF 04
0099 CD 20 C1 D3 C3 C9 C9 20 46 49 4C 34 06
0100 45 0D 0D 1D 1D 1D 1D 1D 12 34 92 2C 02
0101 20 C4 4F 57 4E 4C 4F 41 44 20 C2 3F 04
0102 C1 D3 C9 C3 20 46 49 4C 45 0D 0D E0 04
0103 1D 1D 1D 1D 1D 12 35 92 20 D1 55 17 03
0104 49 54 00 D2 45 41 44 59 20 46 4F AF 03
0105 52 20 C2 C1 D3 C9 C3 0D 0A 00 93 67 05
0106 0D 0D 0D 1D 1D 1D 12 C5 4E 54 45 A6 02
0107 52 20 46 49 4C 45 20 4E 41 4D 45 3E 03
0108 0D 0D 1D 1D 00 00 C9 0D D0 03 A9 12 03
0109 1F 60 C9 1F B0 03 A9 20 60 C9 40 B9 04
0110 D0 03 A9 00 60 C9 5B B0 01 60 C9 48 05
0111 60 B0 11 C9 5B D0 03 A9 1B 60 C9 74 05
0112 5D D0 03 A9 1D 60 A9 20 60 C9 7B 33 05
0113 B0 04 38 E9 60 60 A9 20 60 93 0D CF 04
0114 0D 20 20 20 20 20 20 20 12 C6 49 80 02
0115 4E 49 53 48 45 44 0D 0D 0D 0D 0D 6F 02
0116 20 20 20 C8 49 54 20 41 4E 59 20 61 03
0117 4B 45 59 20 54 4F 20 43 4F 4E 54 75 03
0118 49 4E 55 45 00 1B 70 46 49 4E 49 58 03
0119 53 48 45 44 1B 71 0D 0A 00 20 CC 2A 03
0120 FF A0 00 B9 57 0D F0 07 20 D2 FF 1C 06
0121 C8 4C 1F 0D A2 02 20 C9 FF A0 00 E5 04
0122 8C D8 0D AC D8 0D B9 57 0D F0 0C 95 05
0123 20 FA 08 20 D2 FF EE D8 0D 4C 35 E2 05
0124 0D A2 02 20 C9 FF A9 0A 20 D2 FF B9 05
0125 20 CC FF 60 D2 45 41 44 59 20 46 23 05
0126 4F 52 20 D3 50 45 45 44 20 D3 43 66 04
0127 52 49 50 54 0D 00 20 CC FF A0 00 56 04
0128 B9 AC 0D F0 07 20 D2 FF C8 4C 74 62 06
0129 0D A2 02 20 C9 FF A0 00 8C D8 0D 2B 05
0130 AC D8 0D B9 AC 0D F0 0C 20 FA 08 A3 05
0131 20 D2 FF EE D8 0D 4C 8A 0D A2 02 CE 05
0132 20 C9 FF A9 0A 20 D2 FF 20 CC FF FB 06
0133 60 D2 45 41 44 59 20 46 4F 52 20 01 04
0134 C5 41 53 59 20 D3 43 52 49 50 54 AD 04
0135 0D 00 00 00 00 00 00 00 00 00 00 94 00
0136 00 00 00 00 00 00 00 00 00 00 00 88 00
0137 00 00 93 0D 0D 0D 1D 1D 1D 1D 1D D4 01
0138 1D 1D 1D 12 D3 45 4C 45 43 54 20 53 03
0139 4D 4F 44 45 4D 20 54 59 50 45 3A 99 03
0140 0D 0D 0D 1D 1D 1D 1D 1D 1D 1D 1D 9B 01
0141 1D 1D 12 31 92 20 31 36 35 30 0D 95 02
0142 0D 0D 1D 1D 1D 1D 1D 1D 1D 1D 1D AD 01
0143 1D 12 32 92 20 31 36 36 30 00 6F 02 ■
```

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"Captain's Log, October 1, 1944. 0250 Hours. Fleet submarine USS Hammerhead proceeding Southwest at cruising speed. Our mission: intercept enemy convoy off the coast of Borneo. Disperse and destroy."

Tandy 1000/IBM PC Jr. screens shown

"0300 Hours. Two hours until dawn. Radar picks up convoy, escorted by two destroyers. We believe that one of the enemy's valuable cargo ships is part of convoy formation."

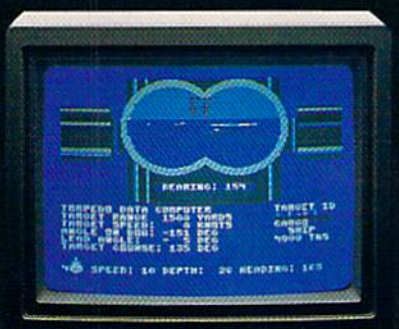
"0400 Hours. Lookouts on the bridge. Target identification party reports one cargo ship, 4,000 tons, troopship of 10,250 tons, with two *Kaibokan*-type escorts. Moving into attack position."

"0500 Hours. Sound General Quarters! Battle stations manned. Preparing for torpedo run. Gauge Panel OK. Periscope OK. Charts and Attack Plot Board OK. All mechanical systems OK."

"0525 Hours. Torpedo rooms report full tubes forward and aft. Battery at full charge for silent running. We hope water temperature will provide thermal barrier to confuse enemy sonar."

"0600 Hours. We are at final attack position. Convoy moving at 10 knots. Target distance decreasing rapidly... Crash Dive! Escorts have spotted us and are turning to attack! Rig to run silent."

"0700 Hours. Depth charged for one hour. Some minor damage, but repair parties at work. Destroyer propeller noises receding. We'll come to periscope depth for our return punch."



"0715 Hours. Torpedo tubes 1, 2, 3 fired. Two destroyers hit and sinking. One of the enemy's last cargo ships coming into 'scope view — an ideal target position. On my mark... Fire Tube 4! Fire 5!"

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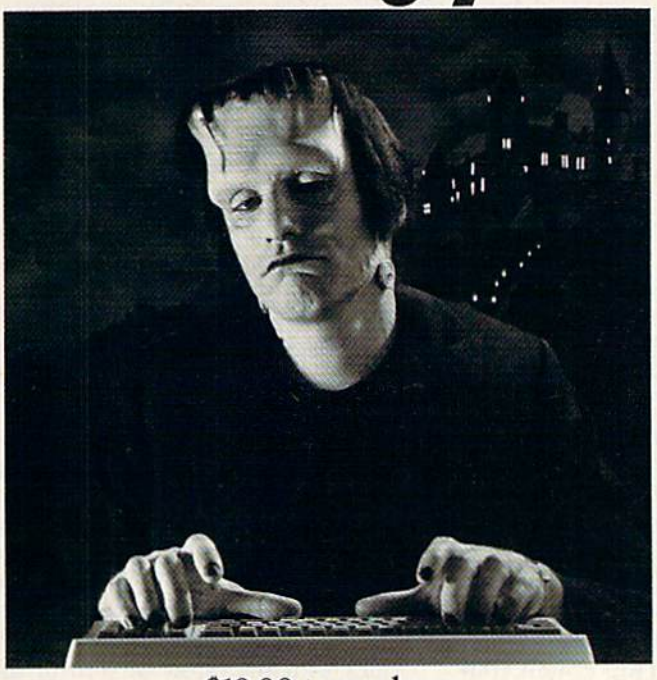

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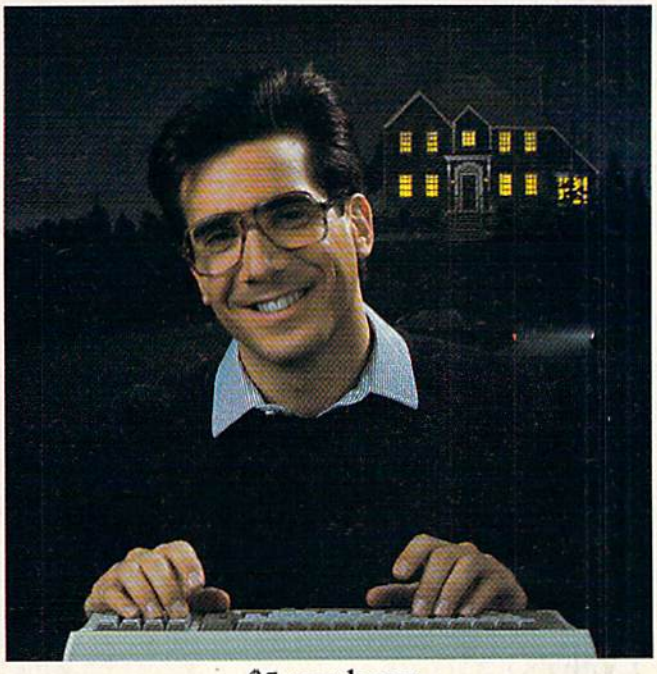

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A Dual Power Pack for GEOS

Here are the first two of several enhancements to be released for GEOS. These Fontpack and Deskpack applications help answer the question, "What else can I do with GEOS?"

By MATTHEW STERN

The creative possibilities available with GEOS are astounding. Perhaps you've already created pictures with geoPaint and experimented with geoWrite's different fonts. You might even have combined text and graphics to make a smashing presentation. What's next?

With Fontpack 1 and Deskpack 1 by Berkeley Softworks, you can use new, attractive fonts; schedule appointments; use Newsroom, Print Shop and Print Master clip art; run non-GEOS files from the Desktop; customize your icons; and even play a few hands of blackjack.

Fontpack 1

Fontpack 1 is a collection of 20 fonts. It includes clear, easy-to-read fonts such as Hearst, classic fonts such as Durant, novelty fonts such as Stadium, and even a set of mathematical symbols. Deskpack 1, sold separately, contains two desktop accessories, Calendar and Blackjack, along with the Art Grabber and Icon Editor utilities.

You can easily install these fonts and desktop accessories on your GEOS system by copying the font and accessory files on your backup work disks. (Do not copy them on the master boot disk that came with GEOS.)

When you insert your work disk into the drive and open it, GEOS reads and activates the font and accessory files. Neither disk is copy-protected, but you must boot GEOS with the master disk to use them.

Each font in Fontpack 1 comes in a variety of sizes and the standard GEOS type styles (Roman, bold, italic, outline, etc.). The manual displays samples of each font and available size. You can copy any number of font files to your work disk, but GEOS will use only the first seven additional fonts. (GEOS uses eight fonts at a time, including the system font, BSW, which is always active.)

You can have different sets of fonts on each work disk, so you can create one disk with a math font for your science papers and another with a script font for personal correspondence. If you try to read in a document with fonts that are not on your work disk, GEOS will try to replace them with another font.

Deskpack 1

Deskpack 1 contains useful utilities and accessories. Calendar keeps track of your appointments. Art Grabber converts Newsroom, Print Shop and Print Master clip art into geoPaint format. Icon Editor lets you customize icons of existing GEOS files and convert other files to GEOS format. And Blackjack helps you unwind after you've done all that work.

As an added bonus, Deskpack 1 comes with the latest version of the

geos file view disk special
file change
S M T W T F S
1 2 3 4 5 6 7
8 9 10 11 12 13 14
15 16 17 18 19 20 21
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Sample screen display from Deskpack 1.

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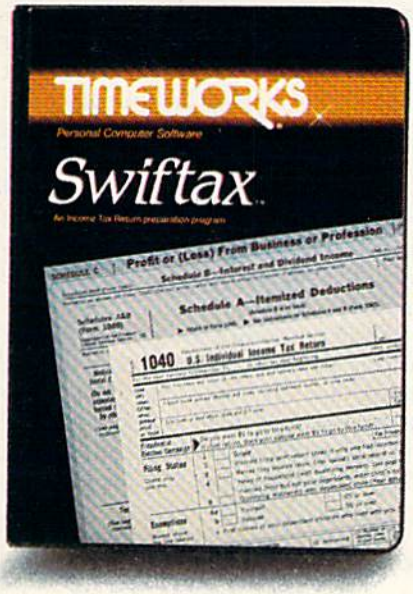

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Desktop, version 1.3, which lets you perform some commonly used commands from the keyboard. To open a new disk, press the Commodore and O keys. To close a disk, press Commodore-C.

Pressing Commodore-I lets you select a new input driver. Version 1.3 includes a number of new input and printer drivers, and the printer driver you select now appears under the printer icon at the Desktop.

Calendar is a handy perpetual calendar you can use while working with another program. To enter appointments, just click on the date. A blank notepad will appear ready for you to jot down your information. Click the OK button to save your notes. An asterisk appears in the calendar on the date of your appointment.

To find all your appointments quickly, just click the question mark icon at the bottom of the screen. This will display all the dates with appointments, and you can click on the date you want to get a complete schedule. As you can see, GEOS's "point and click" controls make Calendar very easy to use.

Although many people appreciate GEOS's ability to integrate graphics with text, they just can't draw very well, even with geoPaint. With Art Grabber, you can add the vast collection of ready-made Newsroom, Print Shop and Print Master artwork to your geoPaint graphics and geoWrite documents.

Select the type of graphic you wish to convert and insert the appropriate Newsroom, Print Shop or Print Master graphic disk. You will see the picture in a small frame on the screen.

If you want to use just one graphic right away, you can convert it to a scrap file and paste it into your picture or document. You can also save it to the Photo Manager, allowing you to collect a number of graphics. The catch is that you can't convert geoPaint graphics back to any other format.

The Icon Editor converts non-GEOS files into GEOS format and modifies icons from existing GEOS programs. You can convert Basic, assembly language or data files, but not relative files.

Unless you have written the program specifically to work with GEOS, the conversion won't allow you to use GEOS's fonts, desk accessories or other features. It will give you an easy way to make icons for GEOS programs you write and let you load most of your non-GEOS program without quitting the system. (You might have trouble with programs that use the Kernal.)

Icon Editor works just like the Pixel Edit mode in geoPaint. You will see an editing window with a close-up view of your icon and an actual-size picture below it.

When you move the pointer to the editing window, it appears as a little yellow box. If you click on a white space, the box turns black for drawing. If you click on an already-drawn pixel, the box turns red for erasing. You can click again to switch the box to yellow to move it without drawing or erasing.

A number of tools help you draw. With a click of a button, you can shift the icon in any direction, invert it (change it from black and white to white and black), flip it vertically or horizontally, or erase it completely. If you make a mistake, you can use the Recover Icon command to return it to the way it was. This will also convert your non-GEOS files back to their regular format.

Each file can have its own icon, which is useful for organizing your files. For example, I created a letterhead with geoWrite for my business letters and changed the icon to my logo. Whenever I want to use my letterhead, I click on it once and select the Duplicate command in the file menu to make a copy. The icon is copied with the rest of the file. Then I open the copy of the file and write my letter with geoWrite. When I am done, the icon shows me that the file is a business letter.

The Icon Editor also allows you to use the same icon for a number of files without redrawing it. You can transfer it to a buffer storage area, load in another file, and then transfer the icon back to the editing window. The buffer icon becomes the new icon for the file, and you can modify it or save it as it is.

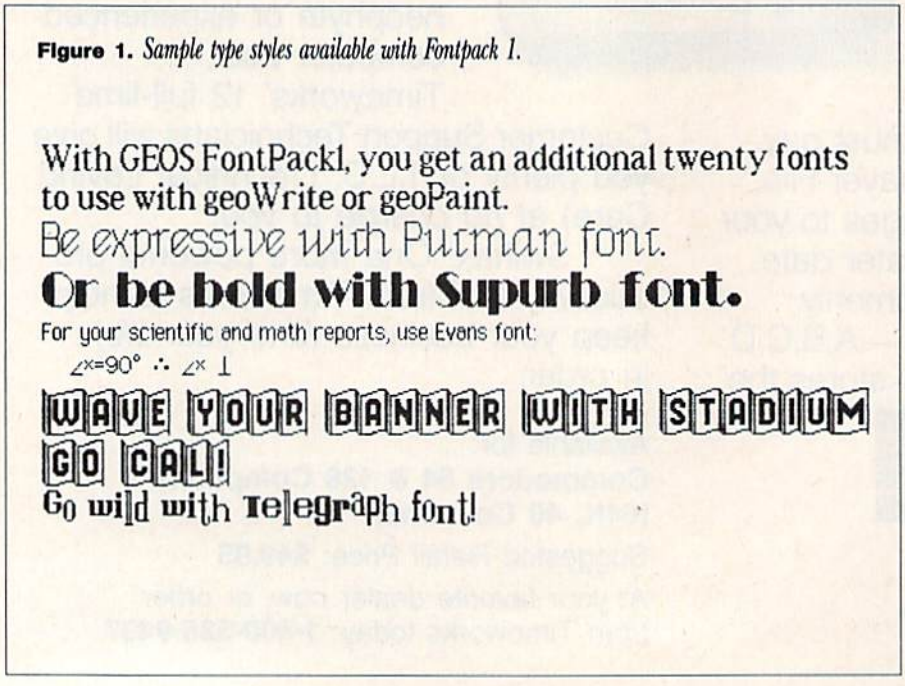
When you need a break, select the Blackjack desktop accessory. It follows standard blackjack rules, including insurance, splits and doubling, and uses a regular 52-card deck. This is the first GEOS application with sound (you can hear the cards being shuffled and dealt), and it has very good animation.

Fontpack 1 and Deskpack 1 are helpful additions to your GEOS collection. The fonts and utilities let you do more with GEOS, and the new Desktop (available only on Deskpack 1) is a definite improvement.

Berkeley Softworks, 2150 Shattuck Ave., Berkeley, CA 94794. Fontpack 1, $29.95; Deskpack 1, $34.95.■

Matthew Stern (6434 Amigo Ave., Reseda, CA 91335) is a free-lance computer writer and is employed at AST Research in Orange County, CA. His microcomputing expertise extends to the Apple Macintosh, Atari ST and the IBM PC, as well as the Commodore 64/128.

Figure 1. *Sample type styles available with Fontpack 1.*


With GEOS FontPack1, you get an additional twenty fonts to use with geoWrite or geoPaint.
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Or be bold with Supurb font.
For your scientific and math reports, use Evans font:
∠x=90° ∴ ∠x ⊥
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DATAFILE 3.6

Here's the latest version of the popular database program that gives you a flexible and powerful way to keep track of your records.

By MIKE KONSHAK

Datafile 3.6 is the newest version of the Datafile database-management system for the C-64—a memory-based system that uses sequential files.

Datafile, the main program of a three-part package, will not alone allow printing of records, but only writing to disk. DFPrint and DFCalc, the two accessory programs that print out Datafile 3.6 files, will be published in the March and April issues of *RUN*.

With Datafile, you can create your own database, choosing the number and length of fields, as well as their titles. After you've created a record file and entered your data, the program will search, sort, delete and modify the records.

As you work with Datafile, keep in mind that it will accept only non-shifted characters when you're inputting data, and that commas, colons, semicolons and quotation marks are not allowed.

If you're adding a large number of records to a file at one sitting, be sure to save the file often, just in case the power goes out unexpectedly.

Datafile Instructions

Datafile 3.6 uses an ML fast sort routine and the DOS 5.1 wedge. First, type in Listing 1 and save it to a newly formatted disk. Next, type in Listing 2. When run, this creates and saves the ML sort file to disk. Lastly, type in Listing 3. This lets you copy DOS 5.1 from your Test Demo disk onto your Datafile disk.

After doing this, you are ready to use Datafile. Just type LOAD "DATAFILE",8 and RUN. The two utilities will load and run, and the main menu will appear as follows:

```
CREATE NEW FILE
QUIT PROGRAM
ADD RECORD TO CURRENT FILE
MODIFY RECORD IN CURRENT FILE
DELETE RECORD IN CURRENT FILE
VIEW OR EDIT FILE
SORT RECORDS BY FIELD
PRINT RECORDS USING DFPRINT/
  DFCALC
READ (LOAD) OLD FILE FROM DISK
WRITE (SAVE) CURRENT FILE
  TO DISK
@ DISK DRIVE COMMANDS
$ 4 DIRECTORY
```

You choose a menu option by pressing the key for the first letter of the option. If your program ever crashes or locks up because of a disk drive or printer error, just type GO 68 <return> to get back to the main menu without losing any record data.

Creating a New Record File

Now you need to create a datafile, so enter C for the Create option. When you create a record file, you're defining the structure to which all its records must conform, so evaluate

RUN It Right

C-64; disk drive; printer

ILLUSTRATED BY CARY HENRIE

carefully the needs of your application. It's rather difficult to change your mind later, although it's possible by using Datafile utility programs. (See *RUN*, November 1985, for the DFRestructure utility.) The rules for creating record file structures are as follows:

1. It's advisable to have no more than 15 fields.
2. As indicated above, field titles cannot contain quotation marks, commas, colons or semicolons.
3. Field length, including the field title, cannot exceed 80 characters.

Now let's create a sample record file for keeping track of club members. The file MEMBERS will have the following structure:

FIELD	TITLE	LENGTH
1	LAST NAME	15
2	FIRST NAME	15
3	STREET	30
4	CITY ST	22
5	ZIP	7
6	PHONE	12
7	DATE JOINED	8

Enter this information and then watch for the display that tells you how many records the structure can hold. If the structure is a good size and otherwise satisfactory, press A to accept it. We'll assume this sample structure is all right. You now have a current file in memory.

Modifying Records

Now, type about ten records into your file for some data to experiment with. When you press M, for modify, on the main menu, Datafile will ask which records you want to change. If you want to change just one, and you know its number, type the number and press return. If you don't know the number or you want to change a number of records, press A to view all the records in the file, one at a time.

The current data in each field in each record will be displayed in turn. If you want to leave the field as is, press return. If you want to erase its data, press the > key. (The > will stay within that record until the file has been saved and reloaded.) You can also copy a field's data by pressing the equals key. At the end of each record, press N to advance to the next record or E to exit.

Unless you know the record number or have changes to make on every record, it's more convenient to use the alternative method of modifying records available through the View or Edit option on the main menu.

Deleting Records

When you press D for deleting records, you once again have to designate a record or press A to go through the whole file. If you can't remember the record number, go to the View or Edit option on the main menu and delete the record from there.

Before Datafile will delete a record, it displays the record's entire contents on the screen. If you're sure you want to delete it, press shift/D.

As the deletion occurs, the count of records in the file decreases, and all the records after the deleted one are renumbered accordingly. To put all your records back into order, you have to use the Sort option in the main menu. Remember to save your revised file to disk.

View or Edit File

This option offers the most flexibility for viewing, scanning and editing the current file. As each record is displayed, you'll be given the following eight choices:

NEXT	LAST	JUMP	FIND
MODIFY	DELETE	PRINT	EXIT

Next makes the screen step to the next record, Last steps it backward to the previous record, and Jump takes it directly to a particular record number, instead of stepping one by one. Print sends the record currently on the screen to your printer.

Find lets you locate records having common data within a certain field. Then you can modify or delete each record. When you're using Find, the screen displays a list of the field names in your current datafile and asks you to enter the number of the one you wish to search. The field name is then displayed, and you must enter the common item. Type in the string of text you're looking for and press return.

For example, if you choose a first-name field, you might enter the string JIM. The computer would search out all the records that begin with JIM in the first-name field. Not only would JIM come up, but also JIMMY, because it begins with JIM.

Sorting

When you pick the Sort option at the main menu, the screen displays the names and numbers of the fields in the file that's in memory. You can sort the file by up to five fields, all in ascending order, and the sort will take less than 10 seconds.

Datafile stores all data as strings, not as actual numbers. For this reason, the value of each field, when compared for sorting, is determined by the position of each character. Therefore, be sure to be consistent with the format when you're entering field data.

Writing Files to Disk

To save (write) a file to disk, choose W at the main menu. Datafile will ask for the name of the file, and save the file after you respond. The name may be up to 12 characters long.

When you save a record file, Datafile automatically adds the four-character prefix DF]<space> to the filename. For instance, the name of your sample file will become DF] MEMBERS. This prefix will show up when you list the directory of the files, but you usually won't need to use the prefix yourself.

Any time a record file is written onto a disk where a file with the same name resides, Datafile makes the earlier version a backup and assigns it the suffix .BAK. Therefore, when your sample file is saved the second time, the first version will be retained on the disk with the name DF] MEMBERS.BAK.

You can load the earlier version from the Read Old File option on the main menu. To do so, enter only your filename with the suffix—MEMBERS.BAK here. Don't include the prefix that shows in the directory.

Datafile keeps only one generation of backups, so the third time you save MEMBERS, the first version will disappear. If, for some reason, you want to keep more than one generation of backups, you must give the older ones a different filename.

Reading Files from Disk

You'll usually pick the Read option from the main menu at the start of a Datafile session. It loads a file you've saved previously. After you've entered R, the program displays all the available files and asks which one you want to load. Type in its name and press return. The file will load, and Datafile will return to the main menu. The program will also return to the

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main menu if you press the return key without typing a filename.

Remember, don't type in the four-character prefix when you enter a filename to be read; just type the name to the right of the bracket and space.

Disk Commands

Datafile has five disk commands. You access the disk command menu, which contains these options plus another that returns you to the main menu, by pressing the @ key at the main menu. The disk-command options are as follows:

Format

This feature allows you to format a blank disk to use for saving files. Insert the disk into the drive, then enter a disk name (up to 16 characters long), a comma, and a 2-character disk ID (any combination of numbers and letters)—for example DATAFILE FILES,D2. Follow this sequence with a return. The drive will whir for about 3½ minutes while it's formatting the disk, then return you to the main menu.

Make sure the disk you place in the drive for formatting is really the one you want to use, because this process will erase the entire disk!

Disk Directory

To list the directory of the disk currently in the drive, press the 4 key. After you've finished viewing the directory, press any key to return to the disk menu.

Scratch a File

To scratch any sequential file on the disk, enter the filename, including the DF]<space> prefix, at the prompt and press return. For instance, to scratch your sample file, you'd type DF] MEMBERS. Be sure to type in the name *exactly* as it appears in the directory, so you don't scratch the wrong file by mistake.

Rename a File

To rename a sequential file, enter the old name exactly as shown in the directory, then the new name when the prompt appears. Be sure to include the special prefixed characters; otherwise, Datafile won't recognize the newly named file, and you won't be able to load it from the main menu.

Validate a Disk

This option removes any corrupted files (splat files, with an * beside them in the directory) from your disk.

Again, we remind you that the programs for printing your records, DFPrint and DFCalc, will appear in *RUN's* March and April issues. R

Address all author correspondence to Mike Konshak, 4821 Harvest Court, Colorado Springs, CO 80917.

Listing 1. *Datafile program.*

```
5 IFFL=ØTHENFL=1:LOAD"DP] SSORT"
  ,8,1                          :REM*35
6 IFFL=1THENFL=2:LOAD"DP] DOS5.1
  ",8,1                         :REM*218
7 IFFL=2THENFL=3::SYS52224
                                :REM*81
8 REM SSORT BY DAVID PETERSON, D
  OS5.1 (C) BY COMMODORE:REM*164
1Ø REM DATAFILE 3.6 (C)1986 BY M
   IKE KONSHAK                  :REM*26
12 POKE5328Ø,Ø:POKE53281,Ø:PRINT
   "{CTRL 8}":GOSUB16:GOSUB6ØØ:G
   OTO68                        :REM*194
16 D$="":MR$=D$:DR$=D$:S=Ø:B1$=D
   $:PW=Ø:CW=Ø:B$=CHR$(32):FL=Ø:
   L$="":E=Ø                    :REM*188
18 NC=Ø:NL=Ø:PG=Ø:F1=Ø:F2=Ø:F3=Ø
   :L$=D$:RL=Ø:SB$=D$:CR$=CHR$(1
   3):HN$=D$:ID$=D$             :REM*24
2Ø A$=D$:C$=D$:T%=Ø:I$=D$:CK=Ø:I
   =Ø:J=Ø:K=Ø:L=Ø:M=Ø:N=Ø:RW=5:S
   F=Ø:Z=Ø:E$="EOF"             :REM*25Ø
22 EN=Ø:EM$=D$:ET=Ø:ES=Ø:A1$=D$:
   A2$=D$:A3$=D$:S1$=D$:TS%=Ø:ME
   M=295ØØ:RETURN               :REM*124
24 DIM F$(F+1),L%(F+1):RETURN
                                :REM*74
26 DIM REC$(R+1,F+1),K%(R+1),S(6
   ):RETURN                     :REM*158
28 :                            :REM*4
3Ø GETA$:IFA$=""THEN3Ø          :REM*2Ø2
32 RETURN                       :REM*9Ø
34 :                            :REM*1Ø
36 IFCK<>ØTHENGOSUB394:IFA$<>"N"
   THEN68                       :REM*76
37 CLR:GOTO4Ø                   :REM*147
38 PRINT"{SHFT CLR} {CTRL 9}{3 S
   PACEs}INITIALIZE (CREATE) A R
   ECORD FILE{2 SPACEs}":RETURN
                                :REM*122
4Ø GOSUB38:GOSUB16:INPUT"{CRSR D
   N}HOW MANY FIELDS IN EACH REC
   ORD{CTRL 8}? Ø {4 CRSR LFs}";
   F                            :REM*72
41 IFF=ØTHEN68                  :REM*249
42 GOSUB24                      :REM*54
43 FORI=1TOF                    :REM*27
44 GOSUB38:PRINT"{2 CRSR DNs}{CT
   RL 9}{COMD 6}FIELD #{CTRL 2}"
   ;I:PRINT"{COMD 6}{CRSR DN}TIT
   LE{CTRL 8} ? >{CRSR UP}":PRIN
   TTAB(8)F$(I)                 :REM*72
46 PRINT"{COMD 6}LENGTH{CTRL 8}?
    Ø{CRSR UP}":PRINTTAB(7)L%(I)
   "{HOME}"                     :REM*86
47 PRINT"{4 CRSR DNs}";TAB(6);:I
   NPUTF$(I):IFF$(I)=""THENF$(I)
   =">"                         :REM*251
48 PRINTTAB(6);:INPUTL$:IFL$="Ø"
   THEN68                       :REM*4
49 IFVAL(L$)>(78-LEN(F$(I)))ORVA
   L(L$)=ØTHENGOSUB6Ø2:PRINT"{2
   CRSR UPs}":GOTO48            :REM*121
5Ø L%(I)=VAL(L$):NEXTI:RL=Ø
                                :REM*16
51 :                            :REM*27
52 FORJ=ØTOF:RL=RL+L%(J):NEXTJ:R
   L=RL+3*(F+1)+5:R=INT((MEM-12*
   (F+1)-21ØØ)/RL)              :REM*198
54 PRINT"{CRSR DN}{COMD 6} YOUR
   SELECTIONS ALLOW {CTRL 8}"R"{
   COMD 6}RECORDS."             :REM*62
56 PRINT" {CTRL 9}{CTRL 2}A{CTRL
    Ø}{COMD 6}CCEPT {CTRL 9}{CTR
   L 2}C{CTRL Ø}{COMD 6}HANGE FI
   ELD DATA OR {CTRL 2}{CTRL 9}R
   {COMD 6}{CTRL Ø}EJECT?{CTRL 8
   }"                           :REM*44
57 GOSUB3Ø:IFA$="R"THEN37
                                :REM*249
58 IFA$="C"THEN43               :REM*16
59 IFA$="A"THENGOSUB26:CK=1:GOTO
   61                           :REM*97
6Ø GOSUB6Ø2:GOTO57              :REM*1ØØ
61 FORI=1TOF:IFLEN(F$(I))>S1THEN
   S1=LEN(F$(I))                :REM*27
62 NEXTI:GOTO68                 :REM*18
64 :                            :REM*4Ø
68 PRINT"{SHFT CLR}{CTRL 8} {CTR
   L 9} DATAFILE 3.6 (C)1986 BY
   MIKE KONSHAK "               :REM*154
7Ø PRINTTAB(3)"{CRSR DN}{CTRL 9}
   {CTRL 2}C{COMD 6}{CTRL Ø}REAT
   E NEW FILE{3 SPACEs}{CTRL 2}{
   CTRL 9}Q{COMD 6}{CTRL Ø}UIT P
   ROGRAM                       :REM*6Ø
72 PRINTTAB(3)"{CRSR DN}{CTRL 9}
   {CTRL 2}A{COMD 6}{CTRL Ø}DD R
   ECORD TO CURRENT FILE:REM*21Ø
74 PRINTTAB(3)"{CRSR DN}{CTRL 9}
   {CTRL 2}M{COMD 6}{CTRL Ø}ODIF
   Y RECORD IN CURRENT FILE
                                :REM*42
76 PRINTTAB(3)"{CRSR DN}{CTRL 9}
   {CTRL 2}D{COMD 6}{CTRL Ø}ELET
   E RECORD IN CURRENT FILE
                                :REM*172
78 PRINTTAB(3)"{CRSR DN}{CTRL 9}
   {CTRL 2}V{COMD 6}{CTRL Ø}IEW
   OR EDIT FILE {CTRL 8}{CTRL 9}
   "NF$"{CTRL Ø}{COMD 6} :REM*68
8Ø PRINTTAB(3)"{CRSR DN}{CTRL 9}
   {CTRL 2}S{COMD 6}{CTRL Ø}ORT
   RECORDS BY FIELD             :REM*138
82 PRINTTAB(3)"{CRSR DN}{CTRL 9}
   {CTRL 2}P{COMD 6}{CTRL Ø}RINT
    RECORDS USING {CTRL 8}DFPRIN
   T{COMD 6}/{CTRL 8}DFCALC
                                :REM*226
84 PRINTTAB(3)"{CRSR DN}{CTRL 9}
   {CTRL 2}R{COMD 6}{CTRL Ø}EAD
   (LOAD) OLD FILE FROM DISK
                                :REM*242
86 PRINTTAB(3)"{CRSR DN}{CTRL 9}
   {CTRL 2}W{COMD 6}{CTRL Ø}RITE
    (SAVE) CURRENT FILE TO DISK
                                :REM*126
88 PRINTTAB(3)"{CRSR DN}{CTRL 9}
   {CTRL 2}@{COMD 6}{CTRL Ø} DIS
   K DRIVE COMMANDS {CTRL 9}{CTR
   L 2}${CTRL Ø} {CTRL 9}4{CTRL
   Ø}{COMD 6} DIRECTORY":REM*2Ø6
9Ø PRINT"{CTRL 8}{CRSR DN} {CTRL
    9}{6 SPACEs}PRESS THE APPROP
   RIATE KEY{7 SPACEs}"  :REM*36
92 PRINT"{COMD 6}{2 SPACEs}THERE
    ARE{CTRL 8}";X;"{COMD 6}RECO
   RDS IN MEMORY{CTRL 8}":REM*38
94 IFR>ØTHENPRINT"{COMD 6}{2 SPA
   CEs}SPACE FOR{CTRL 8}";R-X;"{
   COMD 6}MORE RECORDS{CRSR UP}{
```

Continued on p. 107. ⟶

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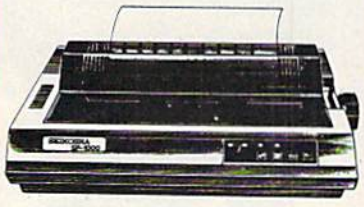

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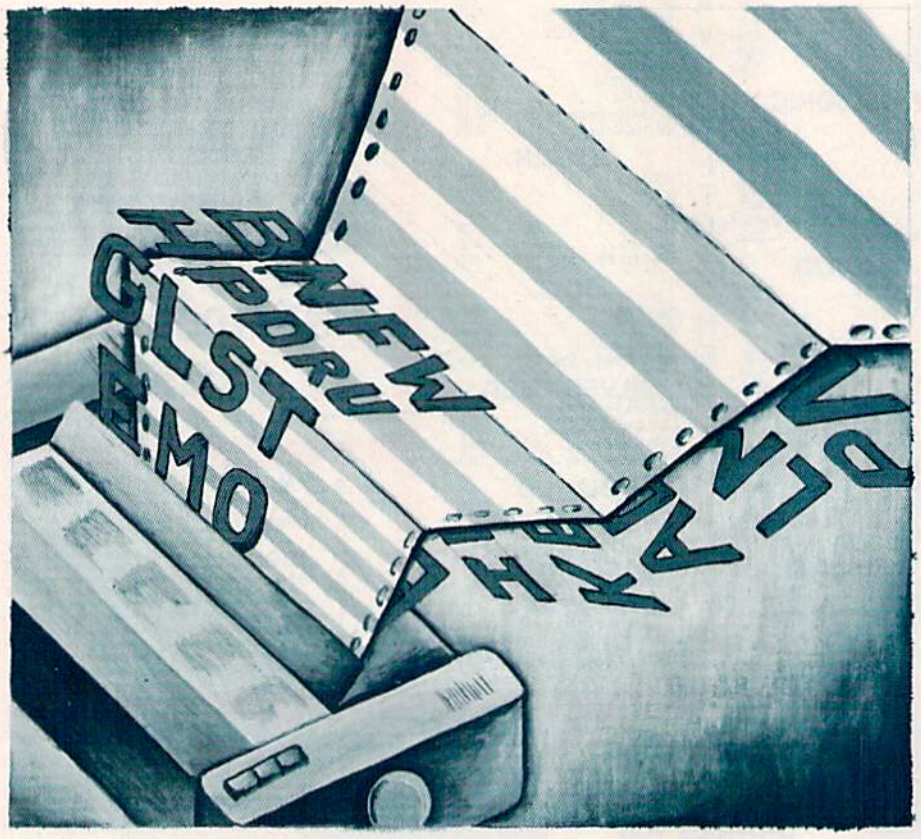
PATCHING UP RUN SCRIPT 128

Use the .po command with the latest version of RUN*'s popular word processor to print on both sides of a page or in a number of columns.*

By ROBERT ROCKEFELLER



This easy-to-use patch program can make RUN Script 128's printing capabilities even more useful to you. The patch provides a page ordering (.po) command, which allows printing on both sides of a page, along with a multicolumn capability for generating documents such as newsletters.

Getting Started

To use the patch, first format a blank disk, then copy each of the following RUN Script 128 files on it: C-128 Character Set and OB.RS NMI, from the "RUN Script 128" article in the December 1986 issue of *RUN*, and Patch RS128, Listing 1 in this article. I'll refer to this as disk 1.

Remove disk 1 from the drive and insert a disk, which I'll call disk 2, containing a copy of the Boot RUN Script 128 program from the December article. Load the boot program, list the last line (280) and change it to read as follows:

```
280 BANK 1: SYS 1024
```

After making the line change, remove disk 2 from the drive, place disk 1 in the drive again and save the boot program to disk 1. Without this line change, none of RUN Script 128's print commands will work.

Now load and run Patch RS128 from disk 1. When you're asked to place in the drive a disk containing a copy of OB.RS128 2.40 (55 blocks of machine language) from the December article, be sure that the copy has been modified with the Create ML program from December. When you're prompted to place a "save" disk in the drive, use disk 1.

After you're finished, disk 1 will contain the following files: C-128 Character Set, OB.RS NMI, Patch RS128, Boot RUN Script 128 and OB.RS128 2.40 with the patch installed. To activate the revised RUN Script 128, just load and run Boot RUN Script 128.

The .po command must be followed by three numbers, which are separated by commas. Using the command requires a little planning on your part, to determine what parameters to use for your desired result, and it works only when continuous output is selected for the printout. Here are some examples that show how the .po command works.

Printing on Both Sides of a Page

One combination of .po settings, .po1,2,1 and .po2,2,1, lets you print on both sides of the page, with text extending across the full width of the page.

The first setting is for the first pass. The first parameter in this setting (1)

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C-128; disk drive

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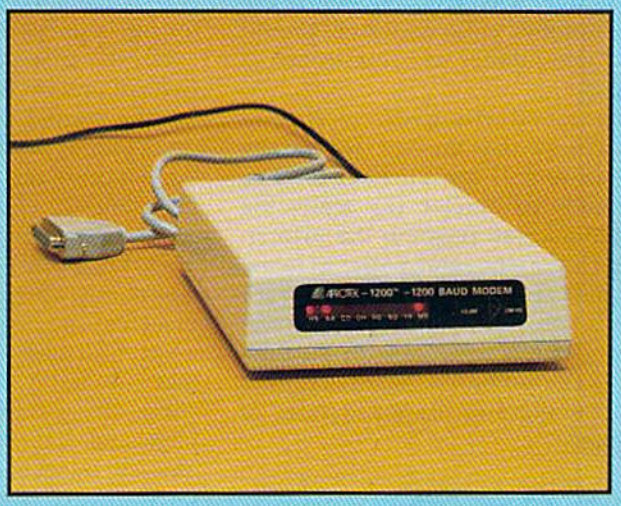

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sends page 1 to the printer or disk; the second parameter (2) specifies that every second page after that also will go to the printer or disk. For example, the odd-numbered pages might be printed and the even-numbered pages not—a phenomenon I call "page cycle." The last parameter in the first setting (1) indicates how many pages will be output before the page number is increased. It should equal the number of columns across the page.

The second setting is for the second pass. Notice that the last two parameters (2 and 1) are unchanged. The new first parameter (2) sends the even-numbered pages to the printer. You print on the same paper as in the first pass, but now you use the back side. If you wish, you can define different headers or footers for the odd- and even-numbered pages to place page numbers on opposite sides of the page.

Printing Only One Page

Another combination, .po20,1,1 .st21, joins the .po and .st commands to print only one page of a document. In this example, pages 1–19 will not be printed, but page 20 will. After page 20, the .st command will bring up the Next Output? prompt, at which point you can abort the print operation.

Printing a Two-Column Newsletter

Only four .po settings are required to print a double-column newsletter on both sides of each page. Even if you aren't printing a newsletter, this is a dynamic command that's useful for other purposes, too.

On the first pass, you'll print the first column on the front of the page. On the second pass, you'll print the first column on the back of the page. On the third and fourth passes, you'll print the two offset columns.

The first page requires a command of .po1,4,2, plus a two-column format command of .pw39.lm6.rm1, both placed at the beginning of the document. Calculate the two-column format command by assuming that 80 characters will be printed across the page, and that the left and right margins will be set at 6. Four columns will separate text columns, resulting in 64 (80 – 6 – 6 – 4) characters per line. So, a two-column format will require each column to be 32 (64/2) characters wide. You can set dot commands I don't mention here, such as .tm, .pl, .hd and .hs, to any value you wish.

After placing the above command at the beginning of the document, print the document, rip off the paper and insert the back side of the first page in the printer. Print the second pass with the .po setting .po3,4,2, leaving the .pw, .lm and .rm settings unchanged at .pw39.lm6.rm1.

After the second pass has printed, insert the front side of the first page into the printer. If you're using a header or footer, I suggest you delete it and increase the .tm and .bm settings to compensate for the lines used by the .hd, .ft, .hs, and .fs commands. Print the third pass with the setting .po2,4,2.pw80.lm42.rm6 placed at the beginning of the document.

Remove the paper, then insert it for the fourth pass, with the opposite side facing the printhead and the setting .po4,4,2.pw80.lm42.rm6 at the beginning of the document. Note that .pw, .lm and .rm are unchanged.

That's all there is to it! Your professional-looking two-sided, multicolumn printouts will make a big splash—and no one has to know how easy they were to produce. R

Address all author correspondence to Robert Rockefeller, R.R. #4, Langton, Ontario, Canada N0E 1G0.

Listing 1. *Patch RS128 program.*

```
10 REM RS128 2.40 PATCH PRG.          :REM*242
20 POKE 47,DEC("6000")AND255:POKE 48,DEC("6
   000")/256:CLR:REM RAISE START OF VARIABL
   ES                                 :REM*84
30 PRINT"{SHFT CLR}INSERT THE DISK WITH THE
    PROGRAM "CHR$(34)"OB.RS128 2.40"CHR$(34
   )" ON IT.":PRINT"THEN PRESS ANY KEY.":GE
   TKEY A$                            :REM*90
40 BANK15:SYS 65424,192:REM TURN ON KERNAL
   MESSAGES                           :REM*104
50 BLOAD"OB.RS128 2.40",B1,P1024      :REM*220
60 PRINT: PRINT"ONE MOMENT PLEASE ... "
                                      :REM*32
70 BANK1:FOR A=DEC("3A75")TO DEC("3B0A"):RE
   AD B:POKE A,B:NEXT A               :REM*168
80 RESTORE 280:FOR A=DEC("1548")TO DEC("156
   2"):READ B:POKE A,B:NEXT A         :REM*48
90 A=DEC("05AC"):B=DEC("3B0A"):POKE A,BAND2
   55:POKE A+1,B/256:POKE A+4,BAND255:POKE
   A+5,B/256                          :REM*4
100 A=DEC("0A5D"):POKE A,76:POKE A+1,0:POKE
    A+2,59                            :REM*0
110 PRINT"INSERT THE SAVE DISK, THEN PRESS
   ANY KEY.":GETKEY A$                :REM*68
120 SCRATCH "OB.RS128 2.40":BSAVE"OB.RS128
   2.40",B1,P1024 TO P(DEC("3B0A")):REM*34
130 DATA 189,178,5,149,20,232,224,37,144,24
   6                                  :REM*74
140 DATA 32,140,58,160,0,162,0,177,118,201
                                      :REM*210
150 DATA 46,240,9,165,14,133,118,165,15,133
                                      :REM*158
160 DATA 119,96,200,177,118,221,240,58,240,
   39                                 :REM*52
170 DATA 232,224,8,144,246,200,208,8,162,2
                                      :REM*160
180 DATA 32,62,8,76,172,16,177,118,201,46
                                      :REM*4
190 DATA 240,5,201,159,208,235,200,152,24,1
   01                                 :REM*196
200 DATA 118,133,118,144,194,230,119,176,19
   0,200                              :REM*166
210 DATA 177,118,221,248,58,240,2,208,207,2
   24                                 :REM*178
220 DATA 0,208,15,32,62,8,32,62,8,32
                                      :REM*182
230 DATA 62,8,32,255,10,76,140,58,200,208
                                      :REM*166
240 DATA 4,162,3,208,191,177,118,201,159,20
   8                                  :REM*48
250 DATA 243,240,199,16,3,5,6,6,8,12
                                      :REM*252
260 DATA 12,15,13,24,12,20,4,3,18,208:REM*1
270 DATA 1,136,202,134,118,132,119,96,159,3
   2                                  :REM*15
280 DATA 32,174,29,162,255,134,124,232,138,
   133                                :REM*45
290 DATA 113,133,114,133,112,160,12,153,78,
   58                                 :REM*189
300 DATA 136,16,250,76,117,58,0       :REM*159
```

■

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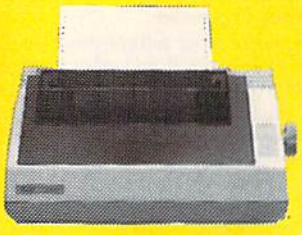

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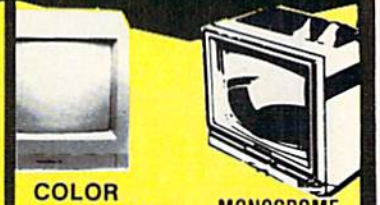

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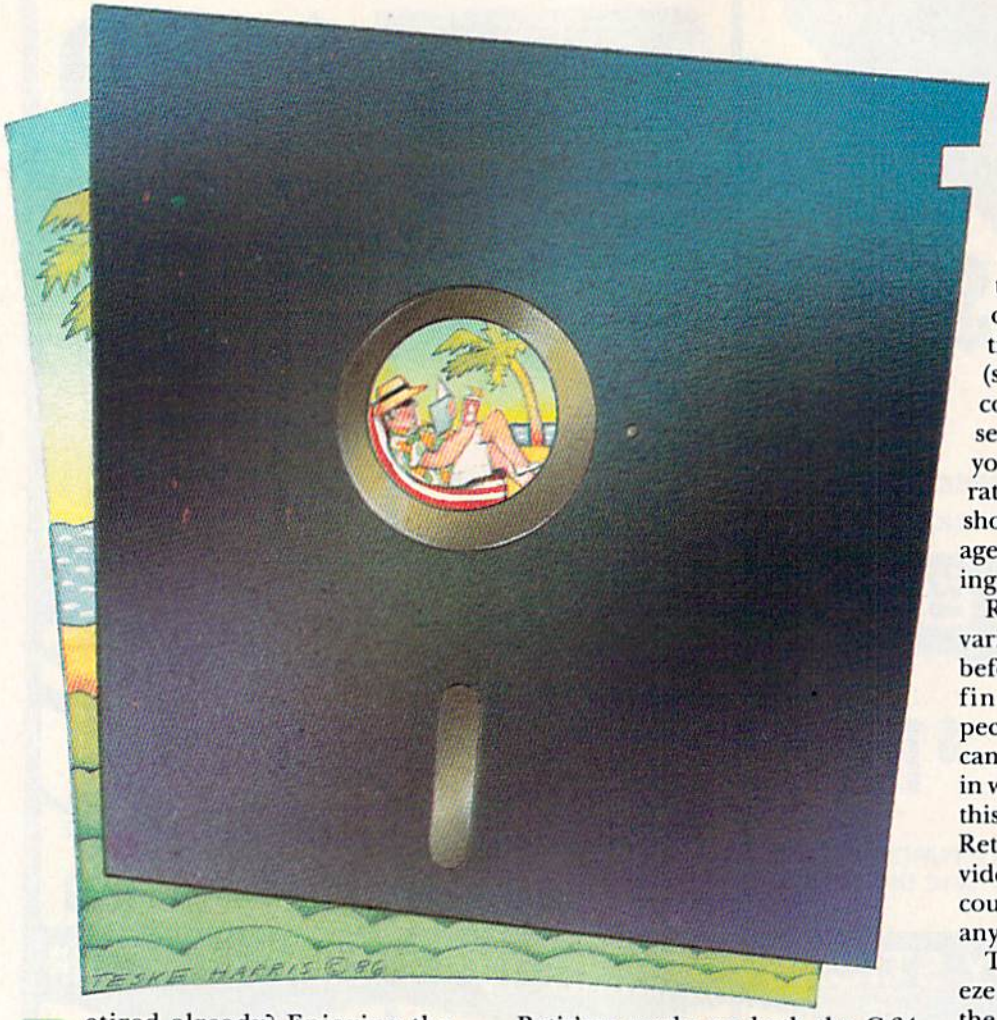
By C. FRANK SCHULENBERG



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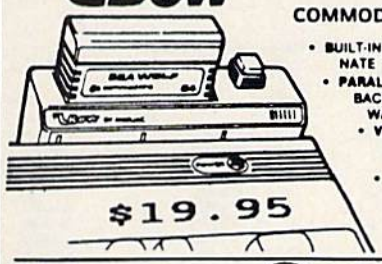

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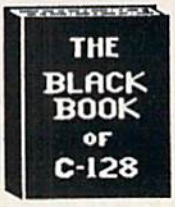

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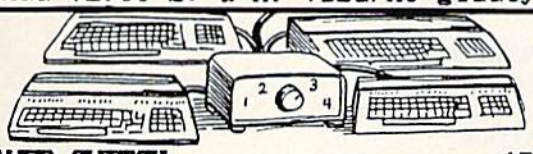

$ SAVER SWITCH $29.95

Vic-20, C16, Plus 4, C64, C128, AB switch 2 computers to 1 drive and printer or two printers to 1 computer. 3 female sockets, plugs in in seconds.

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4,000 files or 100 disks. Add, save, etc. Identifies 14 file types, print lists in 1, 2 or 3 columns, prints disk labels.

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Catalog the movies you have saved on your VCR. 1,000 films or 250 tapes. Print list of titles/tape #, labels for tapes. Data saved: title, start/end, length, category

Circle 121 on Reader Service card.

Table 1.
The Testkases' financial retirement timetable.

1988—GEORGE RETIRES:
Investments/savings = $54,000
Yearly pension, Social Security, etc. = $14,933
Mary's earnings = $14,449
Gross INCOME/BENEFITS = $29,382

1991—GEORGE'S PROFIT-SHARING PAID
INVESTMENTS + $33,400

1993—MARY RETIRES, GETS SOCIAL SECURITY
Mary's earnings – <$15,500>
Mary's S.S. benefits + $3,690
Net INCOME/BENEFITS – <$11,810>

1994—VACATION YEAR
INVESTMENT withdrawal – <$5000>

1995—TEN-YEAR ANNUITY MATURES
INCOME/BENEFITS increase = $6000

1996—FINAL MORTGAGE PAYMENT
Yearly BUDGET decrease – <$4356>

2005—TEN-YEAR ANNUITY EXPIRES
INCOME/BENEFITS decrease – <$6000>

Figure 1. *Retir'eze printout of the Testkases' financial retirement program.*

```
                                        MR. & MRS. TESTKASE
                                        FEBRUARY 1987

                    - RETIR'EZE -

            A FINANCIAL RETIREMENT PROGRAM

                        (PROJECTIONS)

 YEAR   INVESTED FUNDS   EARNED INTEREST   TO/FROM INVEST.   INCOME/ BENEFITS   YEAR'S BUDGET
 ----   --------------   ---------------   ---------------   ----------------   -------------
 1988        54000             4251             -5382             29382             24000
 1989        63633             4932             -4254             29969             25080
 1990        72819             5600             -3711             30569             26208
 1991       115530             8782             -3128             31180             27387
 1992       127440             9651             -2505             31804             28620
 1993       139596            10095              9972             20393             29908
 1994       134720             9694             10920             20801             31254
 1995       133493             9789              5922             27337             32660
 1996       137361            10215              2297             27884             29578
 1997       145279            10780              3084             28442             30909
 1998       152974            11326              3920             29011             32300
 1999       160380            11848              4808             29591             33753
 2000       167420            12340              5749             30183             35272

          $ 33400 LUMP-SUM ADDED TO INVESTED FUNDS IN 1991
          $ 5000 FROM INVESTMENTS CASHED-IN IN 1994
          $ 11810 LOSS IN INCOME/BENEFITS STARTING IN 1993
          $ 6000 MORE IN INCOME/BENEFITS STARTING IN 1995
          $ 6000 LESS IN INCOME/BENEFITS STARTING IN 2005
          $ 4356 LESS YEARLY BUDGET STARTING IN 1996

                                  ESTIMATED R.O.I. - 7.5 %
                                  ANNUAL INFLATION RATE - 5.5 %
                                  ANNUAL CUT-BACK IN EXPENDITURES - 1 %
                                  ANNUAL C.O.L.A. TO BENEFITS - 2 %

   RETIR'EZE DOES NOT COMPENSATE FOR ANY INCOME, BENEFITS OR COST-OF-LIVING
(COLA) ADJUSTMENTS THAT ARE NOT DOCUMENTED AT THIS TIME.
RETIR'EZE COMPUTED FIGURES REPRESENT APPROXIMATIONS AND/OR EXTRAPOLATIONS BASED
ON PROGRAM FORMULAS.

     PREPARED BY: RUN MAGAZINE
     (C) COPYRIGHT 1986 - C. FRANK SCHULENBERG
```

The completed Retir'eze computer printout always includes a record of input data, including inflation rates, ROIs and cost-of-living adjustments (COLAs). The program also summarizes, qualifies and prints dollar amounts and effective years of any financial data you've typed in.

When entering information in response to Retir'eze questions, don't use percent signs, dollar signs or punctuation marks, such as commas. Decimals are permitted. For example, you would use 10550.73 to represent $10,550.73. You can answer most questions with a single digit, a series of digits or a Y or N.

It's best not to skip any of the questions. Based on your answers, however, the program will bypass unnecessary questions. For instance, an N answer to the first section of a multi-part question will take you to the next question.

To help you understand what it is Retire'eze can do for you, see the profile of a fictitious couple nearing retirement that accompanies this article. R

C. Frank Schulenberg (Route 2, Box 737, Evington, VA 24550) has retired to the bucolic life on his 61-acre farm.

Listing 1.
The Retir'eze program.

```
1Ø REM C64/C128 RETIR'EZE:REM*98
2Ø GOTO1Ø5Ø              :REM*122
3Ø OPEN4,4,Ø:CMD4:GOTO 6Ø:REM*44
4Ø OPEN4,4,4:CMD4        :REM*252
5Ø PRINT CHR$(27)"8": REM PAPER
   SENSOR OFF            :REM*1Ø
6Ø PRINTTAB(6Ø)NAME$     :REM*176
7Ø PRINTTAB(6Ø)DATE$:PRINT:PRINT
                         :REM*244
8Ø PRINTCHR$(14) TAB(13)"- RETIR
   'EZE -"               :REM*78
9Ø GOSUB2Ø8Ø              :REM*58
1ØØ PRINTCHR$(14) TAB(Ø6)"A FINA
    NCIAL RETIREMENT PROGRAM"
                         :REM*14Ø
11Ø IF TYPE$="A"THEN PRINTCHR$(1
    5)                   :REM*68
12Ø IF TYPE$="B"THEN PRINTCHR$(1
    29)                  :REM*214
13Ø PRINT                :REM*232
14Ø PRINTTAB(32)"(PROJECTIONS)"
                         :REM*74
15Ø GOSUB2Ø8Ø            :REM*118
16Ø FL=INFL-CUT          :REM*2Ø4
17Ø W=BU-BEN             :REM*9Ø
18Ø PRINTTAB(9)"INVESTED"TAB(8)"
    EARNED";             :REM*12
19Ø PRINTTAB(9)"TO/FROM"TAB(9)"I
    NCOME/"TAB(1Ø)"YEAR'S:REM*6Ø
2ØØ PRINT" YEAR"TAB(6)"FUNDS"TAB
    (8)"INTEREST";       :REM*226
21Ø PRINTTAB(8)"INVEST."TAB(8)"B
    ENEFITS"TAB(1Ø)"BUDGET"
                         :REM*168
22Ø PRINT" ----"TAB(4)"--------"
    TAB(7)"--------";    :REM*136
23Ø PRINT TAB(8)"-------"TAB(8)"
    --------"TAB(1Ø)"------"
                         :REM*62
24Ø I1=(P-(W/2))*I/1ØØ   :REM*18Ø
25Ø PY=(P+I1)-W          :REM*198
26Ø PRINTYR;             :REM*195
27Ø P$=STR$(INT(P))      :REM*2Ø9
28Ø PRINTTAB(11-LEN(P$))P$;
                         :REM*137
29Ø I1$=STR$(INT(I1))    :REM*31
```

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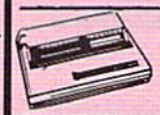

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Circle 98 on Reader Service card.

Listing 1 continued.

```
300 PRINTTAB(15-LEN(I1$))I1$;
                              :REM*19
310 W$=STR$(INT(W))           :REM*35
320 PRINTTAB(15-LEN(W$))W$;
                              :REM*31
330 BEN$=STR$(INT(BEN))       :REM*55
340 PRINTTAB(16-LEN(BEN$))BEN$;
                              :REM*211
350 BU$=STR$(INT(BU))         :REM*99
360 PRINTTAB(16-LEN(BU$))BU$
                              :REM*205
370 CT=CT+1                   :REM*85
380 IF CT>22 THEN ZZ=ZZ+1
                              :REM*119
390 IF CT=4ØGOTO61Ø           :REM*205
400 IF BU>(P+BEN)GOTO61Ø :REM*95
410 IF P<=BU THENGOTO61Ø :REM*57
420 IF P>=1ØØØØØ1 GOTO61Ø
                              :REM*153
430 IF YR=DNE GOTO61Ø         :REM*29
440 IF YX>=(YR+5Ø)GOTO61Ø
                              :REM*185
450 YR=YR+1                   :REM*47
460 IF YR=CEASE THEN BEN=BEN-LOS
    E                         :REM*49
470 IF YR=BGN THEN BEN=BEN+GAIN
                              :REM*231
480 IF YR=AITY THEN BEN=BEN-GAIN
                              :REM*135
490 IF YR=LESS THEN BU=BU-X
                              :REM*1
500 W=BU-BEN                  :REM*165
510 P=PY                      :REM*9
520 IF YR=YER THEN P=P+XTRA
                              :REM*96
530 IF YR=WHAT THEN P=P-AMT
                              :REM*66
540 BU=BU+(BU*FL/1ØØ)    :REM*128
550 W=W+BU*(FL/1ØØ)      :REM*232
560 BEN = BEN+(BEN*UP/1ØØ)
                              :REM*56
570 PAGE=CT+16                :REM*18
580 IF TYPE$<>"C"THEN PAGE = Ø
                              :REM*188
590 IF PAGE=38GOTO19ØØ   :REM*162
600 GOTO24Ø                   :REM*92
610 YR=YR+1                  :REM*208
620 IF TYPE$ <> "C" GOTO 64Ø
                              :REM*40
630 PRINTCHR$(27)"4"          :REM*88
640 GOSUB2Ø8Ø                 :REM*98
650 IF XTRA>ØTHEN66Ø:GOTO67Ø
                              :REM*180
660 PRINTTAB(15)"$";XTRA;"LUMP-S
    UM ADDED TO INVESTED FUNDS I
    N";YER                    :REM*72
670 IF AMT>ØTHEN68Ø:GOTO69Ø
                              :REM*232
680 PRINTTAB(15)"$";AMT;"FROM IN
    VESTMENTS CASHED-IN IN";WHAT
                              :REM*108
690 IF LOSE>ØTHEN7ØØ:GOTO71Ø
                              :REM*154
700 PRINTTAB(15)"$";LOSE;"LOSS I
    N INCOME/BENEFITS STARTING I
    N";CEASE                  :REM*20
710 IF GAIN>ØTHEN72Ø:GOTO73Ø
                              :REM*186
720 PRINTTAB(15)"$";GAIN;"MORE I
    N INCOME/BENEFITS STARTING I
    N";BGN                    :REM*76
730 IF AITY>ØTHEN 74Ø:GOTO75Ø
                              :REM*82
740 PRINTTAB(15)"$";GAIN;"LESS I
    N INCOME/BENEFITS STARTING I
    N";AITY                   :REM*152
750 IF X>ØTHEN76Ø:GOTO77Ø:REM*26
760 PRINTTAB(15)"$";X;"LESS YEAR
    LY BUDGET STARTING IN";LESS
                              :REM*110
770 GOSUB2Ø8Ø                 :REM*229
780 IF P<=BU GOTO83Ø          :REM*211
790 IF BU>(P+BEN)GOTO83Ø:REM*105
800 IF P>=1ØØØØØ1GOTO85Ø:REM*153
810 IF CT >= 4Ø GOTO 85Ø:REM*137
820 IF YR >= DNE THEN 85Ø
                              :REM*235
830 PRINT " INVESTMENTS DEPLETED
     BY YEAR"YR;"- INCOME/BENEFI
    TS MAY CONTINUE."         :REM*141
840 GOSUB2Ø8Ø                 :REM*43
850 PRINTTAB(42)"ESTIMATED R.O.I
    . -";I"%"                 :REM*111
860 PRINTTAB(42)"ANNUAL INFLATIO
    N RATE -"INFL"%"          :REM*41
870 PRINTTAB(42)"ANNUAL CUT-BACK
     IN EXPENDITURES -"CUT"%"
                              :REM*45
880 PRINTTAB(42)"ANNUAL C.O.L.A.
     TO BENEFITS -";UP"%"
                              :REM*149
890 GOSUB2Ø8Ø                 :REM*93
900 PRINTTAB(3)" RETIR'EZE DOES
    NOT COMPENSATE FOR ANY INCOM
    E, BENEFITS";             :REM*125
910 PRINT" OR COST-OF-LIVING
                              :REM*157
920 PRINT"(COLA) ADJUSTMENTS THA
    T ARE NOT DOCUMENTED AT THIS
     TIME."                   :REM*223
930 PRINT"RETIR'EZE COMPUTED FIG
    URES REPRESENT APPROXIMATION
    S AND/OR ";               :REM*205
940 PRINT"EXTRAPOLATIONS BASED O
    N PROGRAM FORMULAS." :REM*99
950 IF CT>22GOTO2Ø1Ø      :REM*95
960 GOSUB2Ø8Ø             :REM*163
970 PRINTTAB(5)"PREPARED BY: ";P
```

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The Deluxe RS232 Interface is the recommended interface for hooking up a standard RS232 modem to your Commodore computer. It hooks up to the USER I/O port of your C64, C128, 64C, SX64, VIC-20, and Plus4 computers. It provides full +10v to -10v RS232 signals for compatibility with all standard RS232 devices. It supports pins 2 thru 8, 12, 20, and 22. These are the standard RS232 pins required for full compatibility and no other interface currently supports all these signals. A three foot cable comes as part of the interface. Switches in the interface cover allow for changing from DTE to DCE. The Deluse RS232 Interface is recommended by Commodore, Avatex, and others. Easy to understand instruction manual includes type-in BASIC terminal program.

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Circle 60 on Reader Service card.

```
   REP$                    :REM*175
98Ø PRINTTAB(5)"(C) COPYRIGHT 19
    86 - C. FRANK SCHULENBERG
                           :REM*225
99Ø IF TYPE$ <>"C" GOTO 1Ø2Ø
                           :REM*185
1ØØØ PRINTCHR$(27)"5":REM 5=ITAL
    ICS OFF                :REM*95
1Ø1Ø PRINTCHR$(27)"@":REM @=RESE
    T OFF.                 :REM*67
1Ø2Ø FORT=1TO4:PRINT:NEXT
                           :REM*167
1Ø3Ø PRINT#4:CLOSE4        :REM*212
1Ø4Ø END                   :REM*22
1Ø5Ø PRINT"{SHFT CLR}":PRINT
                           :REM*11Ø
1Ø6Ø PRINTTAB(6)"FINANCIAL RETIR
    EMENT PROGRAM"         :REM*128
1Ø7Ø GOSUB2Ø8Ø              :REM*18
1Ø8Ø PRINTTAB(5)"WRITTEN BY C. F
    RANK SCHULENBERG       :REM*13Ø
1Ø9Ø GOSUB2Ø8Ø              :REM*38
11ØØ PRINT"THIS C-64/C-128 PROGR
    AM EVALUATES{7 SPACEs}FINAN
    CES PRIOR TO RETIRE";
                           :REM*2Ø2
111Ø PRINT"MENT. ANSWER{4 SPACEs
    }ALL QUESTIONS. DO NOT USE
    PERCENTAGE{4 SPACEs}SIGNS (
    %)";                   :REM*226
112Ø PRINT" OR COMMAS."     :REM*1Ø
113Ø GOSUB2Ø8Ø              :REM*78
114Ø PRINT"EXAMPLES: ENTER 13, N
    OT 13%"                :REM*214
115Ø PRINTTAB(1Ø)"ENTER 1ØØØØ, N
    OT 1Ø,ØØØ              :REM*158
116Ø GOSUB2Ø8Ø             :REM*1Ø8
117Ø INPUT"ENTER YOUR NAME ";NAM
    E$:IFNAME$=""THEN117Ø
                           :REM*54
118Ø GOSUB2Ø8Ø             :REM*128
119Ø INPUT"TODAY'S DATE ";DATE$:
    IFDATE$=""THEN119Ø     :REM*218
12ØØ GOSUB2Ø7Ø             :REM*114
121Ø INPUT"IN WHAT YEAR DO YOU P
    LAN TO RETIRE";YR:IFYR=ØTHE
    N121Ø                  :REM*3Ø
122Ø GOSUB2Ø8Ø             :REM*168
123Ø INPUT"WHAT DO YOU WANT YOUR
     RETIREMENT INCOME TO BE ";
    BU:IFBU=ØTHEN123Ø      :REM*122
124Ø GOSUB2Ø7Ø             :REM*154
125Ø INPUT"HOW MUCH MONEY WILL Y
    OU HAVE INVESTED ONRETIREME
    NT ";P:IFP=ØTHEN125Ø
                           :REM*214
126Ø GOSUB2Ø8Ø             :REM*2Ø8
127Ø INPUT"WHAT % RETURN WILL TH
    ESE INVESTMENTS{4 SPACEs}YI
    ELD";I                 :REM*64
128Ø GOSUB2Ø7Ø             :REM*195
129Ø INPUT"WILL YOU GET A LUMP S
    UM BONUS DURING{4 SPACEs}RE
    TIREMENT (Y/N) ";FUTURE$
                           :REM*149
13ØØ IF FUTURE$="N"GOTO135Ø
                           :REM*195
131Ø GOSUB2Ø8Ø              :REM*3
132Ø INPUT"IN WHAT YEAR WILL YOU
     RECEIVE IT ";YER      :REM*181
133Ø GOSUB2Ø8Ø             :REM*23
134Ø INPUT"ENTER THE AMOUNT OF T
    HE BONUS";XTRA         :REM*133
135Ø GOSUB2Ø7Ø              :REM*9
136Ø INPUT"WILL YOU CASH-IN INVE
    STMENTS WHEN{7 SPACEs}RETIR
    ED (Y/N)";CASH$        :REM*77
137Ø IF CASH$="N"GOTO143Ø:REM*33
138Ø GOSUB2Ø8Ø             :REM*73
139Ø INPUT"HOW MUCH WILL YOU CAS
    H-IN ";AMT             :REM*239
```

The Testkases Look Toward Retirement

George and Mary Testkase are preparing for retirement. George will reach his firm's minimum retirement age of 62 in 1988 and also will be eligible for early Social Security benefits that year. His wife, Mary, has worked on and off during their marriage and has met the minimum qualifications for Social Security benefits. Mary is working now and plans on retiring in 1993. They have decided to set their yearly retirement budget at $24,000 starting in 1988, the year George will retire.

The Testkases have accumulated $41,783.44 in assorted savings accounts, IRAs and a mutual fund. George also has a partially vested interest in his firm's profit-sharing plan.

Their local Social Security office has determined that George's monthly benefits will be approximately $570 upon retirement, assuming he continues to work at his present salary until 1988. Mary's benefits when she retires will include earned benefits based on her own work record, plus benefits she is entitled to as a spouse. She expects her total monthly Social Security benefits to be about half of George's.

They are assuming the average yearly inflation rate won't exceed 5 or 6 percent and are also counting on COLA increases from part of their yearly income for a 2 percent annual gain in their *income/benefits*.

George's firm permits early retirees to delay taking their profit-sharing until they reach 65. George expects his share to be about $33,400 net, if present business conditions prevail. He is reluctant, however, to count on this as a firm asset. Considering tax advantages and other factors, George has decided to wait until he's 65 to claim his share.

The couple's assets also include an inheritance-financed ten-year annuity with guaranteed monthly payments of $500 starting in 1995. In addition, they are looking forward to paying off their home mortgage in 1996.

The Testkases have long postponed their dream vacation: a month-long tour of Europe. They've now scheduled it for the year following Mary's retirement and have decided to allocate $5000 from their invested assets for the trip.

See Table 1 for a look at the Testkases' major financial retirement timetable. Figure 1 is a printout of their personalized financial retirement program produced by Retir'eze.

```
14ØØ GOSUB2Ø8Ø             :REM*93
141Ø INPUT"WHAT YEAR WILL YOU CA
    SH-IN ";WHAT           :REM*253
142Ø GOSUB2Ø8Ø             :REM*113
143Ø GOSUB2Ø7Ø              :REM*89
144Ø PRINT"TOTAL ALL YEARLY PENS
    IONS, ANNUITIES,{3 SPACEs}S
    OCIAL SECURITY, BENEFITS,";
                           :REM*187
145Ø INPUT" ETC., THAT{3 SPACEs}
    YOU WILL RECEIVE ON RETIREM
    ENT ";BEN              :REM*123
146Ø GOSUB2Ø8Ø             :REM*153
147Ø PRINT" WILL A SIGNIFICANT P
    ART OF THE INCOME{2 SPACEs}
    FROM THESE BENEFITS ";
                           :REM*39
148Ø INPUT"CEASE IN THE FUTURE (
    Y/N)";YNO$             :REM*163
149Ø IF YNO$="N" GOTO155Ø
                           :REM*179
15ØØ GOSUB2Ø8Ø             :REM*193
151Ø INPUT"IN WHAT YEAR WILL THE
     BENEFITS DECREASE";CEASE
                           :REM*89
152Ø GOSUB2Ø8Ø             :REM*213
153Ø INPUT"ENTER THE AMOUNT OF T
    HIS LOSS";LOSE         :REM*25
154Ø GOSUB2Ø7Ø             :REM*2ØØ
155Ø PRINT"WILL YOU BEGIN TO REC
    EIVE A NEW SOURCE{2 SPACEs}
    OF BENEFIT";           :REM*112
156Ø INPUT" INCOME DURING RETIRE
    MENT ";NW$             :REM*124
157Ø IF NW$="N" GOTO 164Ø
                           :REM*184
158Ø GOSUB2Ø8Ø              :REM*18
159Ø INPUT"WHAT YEAR WILL NEW BE
    NEFITS BEGIN";BGN      :REM*142
16ØØ GOSUB2Ø8Ø             :REM*38
161Ø INPUT"ENTER THE ANNUAL AMOU
    NT OF THIS INCREASE";GAIN
                           :REM*162
162Ø GOSUB2Ø8Ø             :REM*58
163Ø INPUT"IF TIME-LIMITED, IN W
    HAT YEAR WILL THIS INCREASE
     END";AITY             :REM*1Ø8
```

→

Listing 1 continued.

```
164Ø GOSUB2Ø7Ø              :REM*44
165Ø PRINT"WHAT % OF YOUR ANNUAL
     INCOME/BENEFITS DOYOU ESTI
     MATE WILL";            :REM*86
166Ø INPUT" REFLECT A 'COLA'{6 S
     PACEs}INCREASE (Ø%,1%,2%?)"
     ;UP                    :REM*116
167Ø GOSUB 2Ø7Ø             :REM*74
168Ø PRINT"WHAT DO YOU EXPECT TH
     E ANNUAL INFLATION RATE TO
     BE ";                  :REM*8
169Ø INPUT"DURING RETIREMENT ";I
     NFL                    :REM*112
17ØØ GOSUB2Ø7Ø              :REM*1Ø4
171Ø INPUT"WHAT PERCENT WILL YOU
      REDUCE EXPENSES{3 SPACEs}E
     ACH YEAR (2%,1%,Ø%)";CUT
                            :REM*238
172Ø GOSUB2Ø7Ø              :REM*124
173Ø PRINT"DO YOU EXPECT REDUCTI
     ONS IN EXPENSES TO REDUCE A
     NNUAL BUDGET";         :REM*128
174Ø INPUT" SUCH AS LOANS PAID,E
     TC. (Y/N)";RPT$        :REM*16Ø
175Ø IF RPT$="N" GOTO18ØØ:REM*98
176Ø GOSUB2Ø8Ø              :REM*198
177Ø INPUT"HOW MUCH WILL THIS RE
     DUCE YOUR ANNUAL{3 SPACEs}B
     UDGET";X               :REM*14Ø
178Ø GOSUB2Ø8Ø              :REM*218
179Ø INPUT" IN WHAT YEAR WILL TH
     IS BUDGET DECREASE OCCUR ";
     LESS                   :REM*74
18ØØ GOSUB2Ø7Ø              :REM*2Ø5
181Ø PRINT"TO END THE PROGRAM AF
     TER SPECIFIC YEAR, INPUT YE
     AR.";                  :REM*247
182Ø INPUT" OTHERWISE, PRESS <RE
     TURN>.";DNE            :REM*93
183Ø GOSUB2Ø7Ø              :REM*235
184Ø INPUT"NAME OF PREPARER:";PR
     EP$                    :REM*177
185Ø GOSUB2Ø7Ø              :REM*255
186Ø INPUT"WOULD YOU LIKE TO COR
     RECT THE ANSWERS";ANS$
                            :REM*87
187Ø IF ANS$="Y" THEN 1Ø5Ø
                            :REM*89
188Ø GOTO 2Ø9Ø              :REM*79
189Ø GOSUB2Ø7Ø              :REM*39
19ØØ GOSUB2Ø8Ø:GOSUB2Ø8Ø::REM*49
191Ø PRINTTAB(17)"(RETIR'EZE PRO
     GRAM PRINT-OUT CONTINUES ON
      PAGE 2.)"             :REM*133
192Ø PRINTCHR$(12)          :REM*243
193Ø PRINT                  :REM*247
194Ø PAGE=Ø                 :REM*199
195Ø ZZ=ZZ+27               :REM*229
196Ø PRINTTAB(35) "- PAGE 2 -"
                            :REM*99
197Ø GOSUB2Ø8Ø:GOSUB2Ø8Ø :REM*47
198Ø PRINTTAB(26) CHR$(14)"- RET
     IR'EZE -"              :REM*247
199Ø GOSUB2Ø8Ø              :REM*173
2ØØØ GOTO18Ø                :REM*17
2Ø1Ø IF TYPE$ <> "C" GOTO 96Ø
                            :REM*93
2Ø2Ø XX=5Ø-ZZ               :REM*2Ø9
2Ø3Ø FOR YY=1TOXX           :REM*87
2Ø4Ø PRINT                  :REM*1Ø1
2Ø5Ø NEXTYY                 :REM*116
2Ø6Ø GOTO97Ø                :REM*126
2Ø7Ø PRINT"{SHFT CLR}":PRINT:RET
     URN                    :REM*198
2Ø8Ø PRINT:RETURN           :REM*72
2Ø9Ø REM PRINTERS           :REM*56
21ØØ PRINT"{SHFT CLR}"      :REM*5Ø
211Ø PRINT TAB(2)"ENTER THE LETT
     ER (A,B,C) FOR"        :REM*78
212Ø PRINT" YOUR PRINTER..."
                            :REM*234
213Ø GOSUB2Ø8Ø:GOSUB2Ø8Ø:REM*2Ø8
214Ø PRINT TAB(3) "A = MPS-8Ø3/M
     PS-1ØØØ/1525"          :REM*162
215Ø GOSUB2Ø8Ø              :REM*78
216Ø PRINT TAB(3) "B = 1526/MPS-
     8Ø2"                   :REM*5Ø
217Ø GOSUB2Ø8Ø              :REM*98
218Ø PRINT TAB(3) "C = EPSON/STA
     R/ASCII"               :REM*138
219Ø GOSUB2Ø8Ø              :REM*118
22ØØ INPUT"PRINTER ";TYPE$
                            :REM*114
221Ø GOSUB 2Ø8Ø             :REM*138
222Ø IF TYPE$="A" OR TYPE$="B" G
     OTO3Ø                  :REM*168
223Ø IF TYPE$="C" GOTO 4Ø
                            :REM*21Ø
224Ø IF TYPE$ <> "A" GOTO 225Ø
                            :REM*214
225Ø IF TYPE$ <> "B" GOTO 226Ø
                            :REM*232
226Ø IF TYPE$ <> "C" GOTO 227Ø
                            :REM*252
227Ø PRINT"{SHFT CLR}"      :REM*22Ø
228Ø PRINT"INCORRECT INPUT - TRY
      AGAIN!"               :REM*234
229Ø GOSUB2Ø8Ø              :REM*218
23ØØ GOTO 211Ø                :REM*2
```

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TWIDDLE

It's a test of wits and strategy when you accept the challenge of Twiddle, a two-player C-128 game that involves some interesting twists.

By MICHAEL BROUSSARD

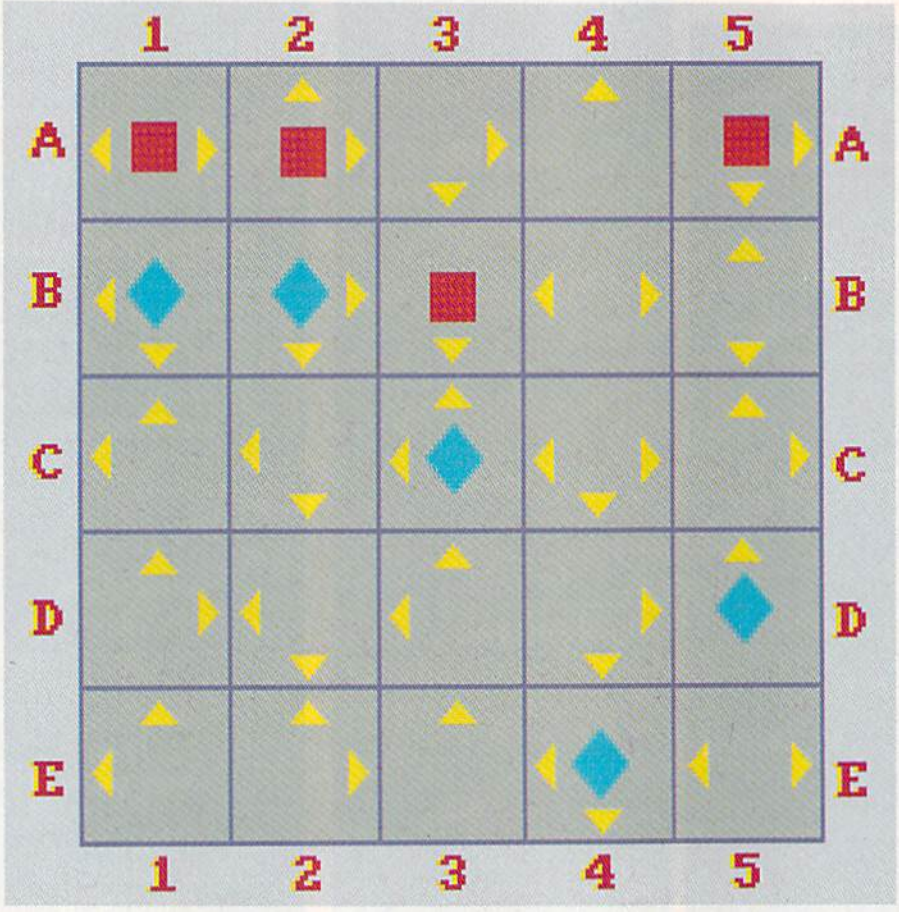

Figure 1. *The standard Twiddle game board.*

Twiddle is a two-player strategy game for the C-128. It's written in Basic 7.0, except for a short machine language subroutine that's poked into the cassette buffer when the program starts.

The object of Twiddle is to wipe out all your opponent's pieces before he or she wipes out yours. The rules are deceptively simple; once you start playing, you'll discover more and more subtle and complex strategies. To play the game, simply type in Listing 1 and type RUN.

The program will first ask whether you want to play the standard game. To choose this option, just press the return key, and the screen will blank out for a few seconds while the program sets up the board. (It's possible to vary the rules from game to game to make it more challenging for advanced players or to introduce a measure of chance. Exactly how you do this is explained later.)

Soon a five-by-five square grid will appear on the screen, labeled with the letters A through E on the left (one letter per row) and the numbers 1 through 5 across the top (one number per column). Each square is identified by specifying its row and column; for example, the square in the upper-left corner is A1, and the square in the lower right corner is E5. Player 1's pieces are the red squares in the top row of the board (squares A1–A5); player 2's pieces are the blue diamonds in the last row (squares E1–E5).

The Basic Moves

When the game begins, player 1 (the red squares) has the first turn. A turn consists of three moves, which can be made by a single piece, or split up among multiple pieces as desired. To specify a move, just type the location of the starting square, followed by the destination square, and press the return key.

For example, to move from A2 to B2, you would type A2B2 <return>. If you make a mistake, use the delete key to erase one character at a time. You must make the correction before you press the return key.

Figure 1, which shows a possible configuration of the game board, will help you to visualize the movement rules as they are described. Each square on the board contains from one to four arrows. The placement of the arrows is random and varies from game to game.

For a piece residing on a given square, these arrows indicate to which

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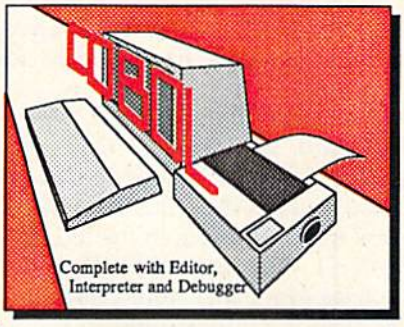

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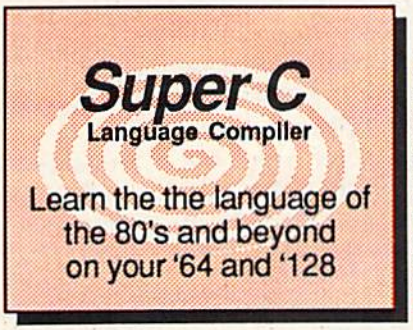

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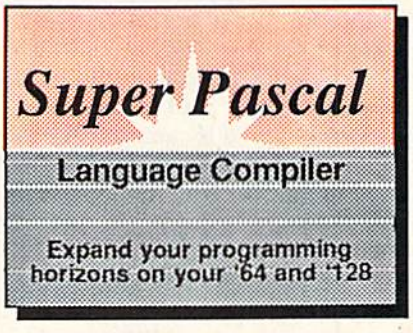

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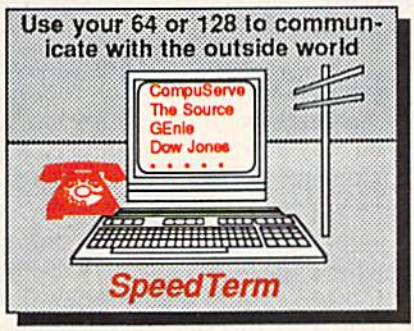

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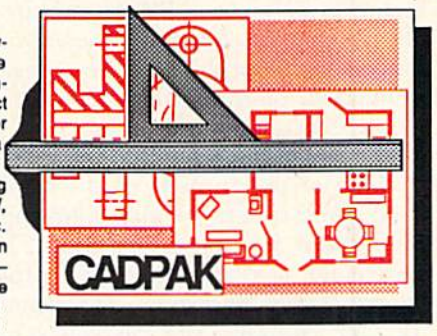

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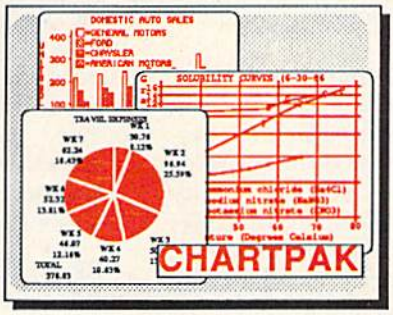

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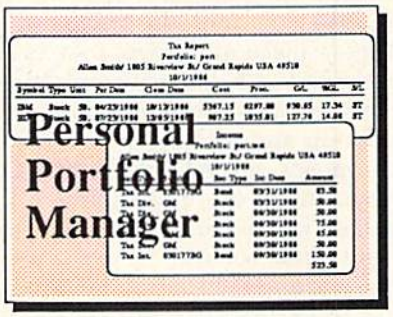

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other squares that piece may move. For example, square B2 in the figure has two arrows, one pointing to the right and one pointing down. This means that a piece at B2 may move to either B3 (one square to the right) or C2 (one square down). It may not move to either of the other two adjacent squares, B1 or A2, because there is no arrow pointing in either of those directions. (Pieces may be moved only horizontally or vertically, not diagonally.)

If a piece is on the left edge of the board, say, at A1, it may "wrap around" to the right edge of the board (square A5, in this case) if there is an arrow pointing to the left, as in Figure 1. More generally, if a piece makes a move that would send it off the grid, it wraps around to the opposite side of the board. As another example, the piece on A2 could move to A3, or it might wrap around to E2.

A piece may not move onto a square occupied by another piece of the same color. For instance, the piece at A1 may not move to A2. Moving onto a square occupied by an opponent's piece captures that piece and removes it from play (which is, of course, the object of the game). In Figure 1, the piece at B2 can capture the piece at B3. It cannot, however, capture the piece at A2, because there is no arrow pointing from B2 to A2.

Rules of the Game

Much of the strategy of the standard game hinges on the following rule: When a piece moves out of a square, the arrows in that square rotate clockwise 90 degrees. For example, A1 contains two arrows, one pointing left and the other right. When a piece moves from A1 to A2 or wraps to A5, the arrows in A1 rotate one turn clockwise and now point up and down. The next piece that moves into A1 will have to exit by moving to B1 or wrapping to E1, as that's where the arrows now point.

If desired, you can "spend" a move by specifying the source and destination to be the same square. For example, moving a piece from C3 to C3 uses up a move but does not change the position of any other piece on the board. It does, however, make the arrows in C3 rotate.

There are two other rules in the standard game. First, player 1's pieces may not wrap around from the top row to the bottom row (even if the arrows in the square would allow such a move) until each of player 1's pieces has moved at least once. Likewise, player 2's pieces may not wrap around from the bottom to the top of the grid until they satisfy the same requirement. The purpose of this rule is to prevent one player from gaining an unfair early advantage by wrapping around on the first move and wiping out several of his or her opponent's pieces.

As I mentioned earlier, a turn consists of three moves. Starting with the sample diagram shown in Figure 1, suppose the diamond player elects to move as follows:

1. C3→B3 Captures the piece at B3 and makes the arrows in C3 rotate.
2. B1→B1 Makes the arrows in B1 rotate, but no piece changes position.
3. B1→A1 After move 2, an arrow points up from B1; this move captures the piece at A1 and makes the arrows in B1 rotate again.

Toward the end of the game, few pieces will be left on the board, and the players will be spending most of their time trying to stay away from each other. Twiddle contains a rule that is designed to ensure that the game *will* eventually end.

If 15 turns elapse without any piece being captured, the number of moves per turn increases by one, from three to four. If 15 more turns elapse, the number of moves increases to five, and so on up to a maximum of six. As the number of moves per turn increases, it becomes harder to stay out of reach of enemy pieces. The player who captured the last piece is the first player to have a turn with the increased number of moves.

Altering the Game Parameters

That's all there is to playing the standard game. Since different players might wish to use different rules and difficulty levels, you can specify certain parameters at setup time. Remember that when the program starts, it asks whether you wish to play the standard game, and a default answer of "yes" is displayed. If you'd like to change one or more game parameters, press the cursor-right key to change to "no." Then press the return key, and you'll be asked to specify the size of the game board.

The default size, five-by-five, will be displayed, but again you can use the cursor-right key to loop through all the possible choices. (Use the cursor-left key to cycle backward.) You can choose any grid size, from three-by-three up to six-by-six. Press the return key to lock in your choice.

The next parameter you can set is the number of moves each player gets per turn. The default is 3, but you can change it to any value from 1 to 6.

You can also specify how the arrows should rotate when a piece moves out of a square. The default is one 90-degree rotation (clockwise), but you can specify random rotation, in which case the arrows turn 90 degrees anywhere from one to four times, or no rotation, which means they won't turn at all.

Finally, you can override the rule that forbids wrapping from the top to the bottom of the board (and vice versa) before all the pieces have moved at least once. Just cycle to "yes" when asked whether you want to allow immediate wraparound.

Permanent Modifications

After playing the game several times, you might discover that you always begin by changing the size of the board or increasing the number of moves per turn. If you like, you can customize the program so that it uses your preferred start-up parameters as the defaults for the standard game. This is done by modifying the values of certain variables in line 10 of the listing. (Be sure to save the new version of the program after making any changes.)

For example, you might decide that you'd like the default game board size to be six-by-six instead of five-by-five. You can specify this by changing the value assigned to the variable BD from 5 to 6. From then on, when you choose the default setup, the board will be six squares on a side instead of five.

Here's a summary of the other variables you can change and what their values mean:

—RR specifies the amount of rotation applied to the arrows in a square when a piece moves out of the square. The default is 1, but you can change it to 0 (no rotation) or 4 (random rotation).

—The default number of moves per player is 3, but you can change this by modifying the value assigned to the variable NM.

—Another default is no wrapping

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from the top to the bottom of the grid until a player has moved each piece at least once. You can modify this by changing the value assigned to the variable WF from −1 to 0.

—During play, the number of moves available to each player per turn increases by one if 15 turns elapse with no piece on the board being captured. This is controlled by the value of the variable TX. Changing this value to 9, for example, would make the number of moves per turn increase if nine turns passed without a capture. If you never want the number of moves per turn to change, set this value to some extremely large number, say 99999.

—Finally, the default background color of the screen is green (6). You can alter this by changing the value assigned to the variable FC.

I'll be happy to answer any questions you have about Twiddle. Please be sure to enclose a self-addressed stamped envelope with your inquiry. Have fun Twiddling! ®

Michael Broussard (13136 Lazy Glen Court, Herndon, VA 22071) is a systems engineer for Stratus Computer, a manufacturer of fault-tolerant super minicomputers. In addition to computers, his interests include writing, cooking, music and reptiles, especially Jake, his red-footed tortoise.

Listing 1. *The Twiddle program.*

```
10 BD=5:RR=1:NM=3:WF=-1:TX=15:BC
   =6:FC=1:VOL0:GOSUB103:VOL8:G
   OSUB860:FAST              :REM*84
20 DIM XX(14),X$(7),Z(36),ZZ(36)
   ,FM(36),NP(2):COLOR4,BC:COLOR
   0,BC:COLOR1,FC            :REM*196
30 B1$="":READL:FORK=1TOL:READN:
   B1$=B1$+CHR$(N):NEXT      :REM*4
40 B2$="":READL:FORK=1TOL:READN:
   B2$=B2$+CHR$(N):NEXT      :REM*160
50 FORJ=1TO7:X$(J)="":READL:FORK
   =1TOL:READN:X$(J)=X$(J)+CHR$(
   N):NEXTK:NEXTJ            :REM*166
60 FORK=2816TO2851:READN:POKEK,N
   :NEXT:GRAPHIC1,1:X=15:Y=15:WI
   DTH2                      :REM*84
70 FORJ=1TOBD+1:DRAW1,X,Y TO X+4
   0*BD,Y:Y=Y+30:NEXT        :REM*34
80 X=15:Y=15:FORJ=1TOBD+1:DRAW1,
   X,Y TO X,Y+30*BD:X=X+40:NEXT
                             :REM*52
90 CHAR1,4,0,MID$("1{4 SPACEs}2{
   4 SPACEs}3{4 SPACEs}4{4 SPACE
   s}5{4 SPACEs}6",1,(BD-1)*5+1)
                             :REM*16
100 FORI=1TOBD:CHAR1,0,2+(I-1)*3
   +I+(I>3),MID$("{CTRL A}{CTRL
    B}{CTRL C}{CTRL D}{CTRL 2}{
   CTRL F}",I,1):NEXT        :REM*146
110 REM GOTO 320             :REM*100
120 XX(1)=32:XX(2)=17:XX(3)=50:X
   X(4)=27:XX(5)=32:XX(6)=40:XX
   (7)=18:XX(8)=27:XX(9)=33:XX(
   10)=28:XX(11)=33:XX(12)=28:X
   X(13)=32:XX(14)=27        :REM*172
130 FORJ=BD+1TO36:FM(J)=0:NEXT:X
   =BD*(BD-1):FORJ=1TOBD:FM(J)=
   1:FM(J+X)=1:NEXTJ         :REM*226
140 FORJ=1TOBD:ZZ(J)=5:P1=5:P2=J
   :GOSUB250:NEXTJ:NP(1)=BD:NP(
   2)=BD                     :REM*190
150 FORJ=BD*(BD-1)+1TOBD*BD:ZZ(J
   )=6:P1=6:P2=J:GOSUB250:NEXTJ
                             :REM*106
160 FORJ=1TOBD*BD            :REM*96
170 JJ=INT(RND(1)*17)+1:IFJJ>15T
   HENJJ=15                  :REM*186
180 IFJ<BD+1THENJJ=JJAND254:JJ=J
   JOR4                      :REM*120
190 IFJ>BD*(BD-1)THENJJ=JJAND251
   :JJ=JJOR1                 :REM*2
200 IFJJ=0THEN170:ELSEZ(J)=JJ:P1
   =JJ:P2=J:GOSUB220:NEXTJ
                             :REM*194
210 SLOW:PN=2:GOTO290        :REM*148
220 L=P1:FORCC=1TO4          :REM*12
230 P1=L AND (2{UP ARROW}(CC-1))
   :IF P1 THEN P1=CC:ELSE P1 =
   -CC                       :REM*164
240 GOSUB 250 : NEXT : RETURN
                             :REM*58
250 R=INT((P2-1)/BD):C=P2-BD*R-1
   :IFC<0THENC=BD-1          :REM*192
260 IFP1=5ORP1=6THENBEGIN:IFP1=5
   THENCOLOR1,3:ELSECOLOR1,7:BE
   ND                        :REM*225
270 IF P1<0 THEN BEGIN:PP=0:IF A
   BS(P1)/2=INT(ABS(P1)/2)THENX
   $(0)=B2$:ELSEX$(0)=B1$:BEND:
   ELSE PP=P1                :REM*193
280 K=(ABS(P1)-1)*2+1:LOCATEXX(K
   )+40*C,XX(K+1)+30*R:GSHAPEX$
   (PP):COLOR1,1:RETURN      :REM*5
290 PN=2                     :REM*73
300 DO:MC=MC+1:IF MC>TX THENIF N
   M<6 THENNM=NM+1:MC=0:GRAPHIC
   0:PRINT"{SHFT CLR}{10 CRSR D
   Ns}{3 SPACEs}NUMBER OF MOVES
    PER TURN IS NOW"+STR$(NM):F
   ORK=1TO2200:NEXTK:GRAPHIC1
                             :REM*15
310 BF=1:FORJ=1TO 600:NEXT:PN=PN
   +1+2*(PN=2):FORNI=1TONM:P1=P
   N                         :REM*155
320 DF=0:GOSUB550:GOTO340:REM*97
330 CHAR1,34,16,"BAD":CHAR1,34,1
   7,"MOVE":SOUND1,3200,35:FORK
   =1TO1600:NEXTK:CHAR1,34,16,"
   {3 SPACEs}":CHAR1,34,17,"{4
   SPACEs}":GOTO320          :REM*151
340 IFP3=P4THENBEGIN:IFZZ(P3)<>P
   N+4THEN330:ELSE450:BEND
                             :REM*25
350 IFPN=1THENP1=1:ELSEP1=BD*(BD
   -1)+1                     :REM*145
360 K=0:FORJ=P1TOP1+BD-1:K=K+FM(
   J):NEXT                   :REM*227
370 IF PN=1 AND P3<=BD AND P4>BD
   *(BD-1) AND K AND WF THEN330
                             :REM*209
380 IF PN=2 AND P3>BD*(BD-1) AND
    P4<=BD AND K AND WF THEN330
                             :REM*187
390 IFZZ(P4)=PN+4 OR ZZ(P3)<>PN+
   4 THEN330                 :REM*169
400 R1=INT((P3-1)/BD):C1=P3-BD*R
   1-1:R2=INT((P4-1)/BD):C2=P4-
   BD*R2-1                   :REM*95
410 IFNOT( (ABS(R2-R1)+ABS(C2-C1
   )=1) OR (ABS(C2-C1)=BD-1ANDR
   2=R1) OR (ABS(R2-R1)=BD-1AND
   C2=C1) ) THEN 330         :REM*189
420 D=0:IFC1<>C2THENBEGIN:IF(C1+
   1=C2)OR(C1-(BD-1)=C2)THEND=2
   :GOTO440:ELSED=8:BEND:GOTO44
   0                         :REM*175
430 IFR1<>R2THENIF(R1+1=R2)OR(R1
   -(BD-1)=R2)THEND=4:ELSED=1
                             :REM*113
440 IF(Z(P3)AND D)=0 THEN 330
                             :REM*179
450 CHAR1,34,5,MID$("{6 SHFT Qs}
   ",1,NM-NI)+MID$("{6 SPACEs}"
   ,1,NI)                    :REM*3
460 IF ZZ(P4)=0 OR ZZ(P4)=PN+4 T
   HEN480                    :REM*243
470 GOSUB1030:K=1-(PN=1):NP(K)=N
   P(K)-1:IFNP(K)=0THEN DN=1
                             :REM*235
480 P1=7:P2=P3:GOSUB250:P1=PN+4:
   P2=P4:GOSUB250:ZZ(P4)=ZZ(P3)
   :IFP3<>P4THENZZ(P3)=0
                             :REM*151
490 FM(P3)=0:FM(P4)=0        :REM*223
500 IF RR THEN BEGIN:IF Z(P3)=15
   THENJ=1:ELSEJ=INT(RND(1)*RR)
   +1:BEND:ELSE 530          :REM*245
510 FORK2=1TOJ:POKE251,1:POKE252
   ,Z(P3):SYS2816:Z(P3)=PEEK(25
   2)                        :REM*169
520 P1=Z(P3):P2=P3:SOUND1,3100,2
   :SOUND1,4200,20,0,3000,46:
   GOSUB220:NEXTK2           :REM*218
530 IFDNTHENA$="{16 SPACEs}":B$=
   " PLAYER"+STR$(PN)+" WINS! "
   :CHAR1,12,11,A$,1:CHAR1,12,1
   2,B$,1:CHAR1,12,13,A$,1:FORJ
   =1TO4000:NEXTJ:GRAPHIC0,1:EN
   D                         :REM*222
540 NEXTNI : LOOP            :REM*178
550 X=34:X1=X+NM-NI-DF:IFX>X1THE
   N580                      :REM*250
560 FORX=XTOX1:CHAR1,X,5,"{SHFT
   Q}":IF BFTHENSOUND1,1000,11
   ,2:FORK=1TO120:NEXTK:REM*106
570 NEXTX                    :REM*8
580 CHAR1,X,5,MID$("{5 SPACEs}",
   1,NI)                     :REM*106
590 BF=0:CHAR1,34,6,"PLAYER":CHA
   R1,35,7,STR$(PN):CHAR1,34,9,
   "MOVE":CHAR1,34,10,"FROM":CH
   AR1,35,11,"??":CHAR1,35,12,"
   TO":CHAR1,35,13,"??"      :REM*8
600 X=35:Y=11:GX=0           :REM*84
610 GETKEYA$:IF(ASC(A$)=13)AND(G
   X=4)THENP3=(ASC(G$(1))-65)*B
   D+VAL(G$(2)):P4=(ASC(G$(3))-
   65)*BD+VAL(G$(4)):RETURN
                             :REM*24
620 IF(ASC(A$)<>20)ORGX=0THEN650
                             :REM*104
630 IFGX=2THENBEGINX=X+1:Y=Y-2:B
   END:ELSEX=X-1             :REM*234
640 GX=GX-1:CHAR1,X,Y,"?":REM*26
650 IFINT(GX/2)=GX/2THENIX$=MID$
   ("ABCDEF",1,BD):ELSEIX$=MID$
   ("123456",1,BD)           :REM*174
660 IFINSTR(IX$,A$)=0ORGX=4THEN6
   10                        :REM*42
670 GX=GX+1:G$(GX)=A$:CHAR1,X,Y,
   A$:X=X+1:IFGX=2THENX=X-2:Y=Y
   +2                        :REM*162
680 GOTO610                  :REM*156
690 DATA USE DEFAULT SETUP VALUE
   S?,2,"YES","NO "          :REM*110
700 DATA SELECT BOARD SIZE,4,5 B
   Y 5,6 BY 6,3 BY 3,4 BY 4
                             :REM*240
710 DATA SELECT NUMBER OF MOVES
    PER TURN,5,3,4,5,1,2 :REM*26
720 DATA SELECT HOW ARROWS SHOUL
   D ROTATE,3,"{3 SPACEs}1 ROTA
   TION{2 SPACEs}","RANDOM ROTA
   TION"," NO ROTATION "
                             :REM*148
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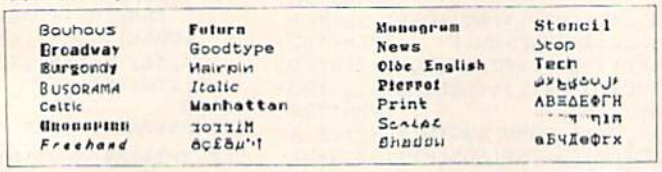

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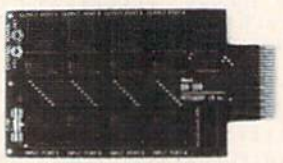

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Listing 1 continued.

```
73Ø DATA ALLOW IMMEDIATE WRAPARO
    UND?,2,"NO ","YES"  :REM*216
74Ø DATA END                :REM*138
75Ø DATA 9,Ø,Ø,Ø,Ø,Ø,7,Ø,4,Ø : R
    EM B1$                  :REM*18
76Ø DATA 12,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,4,Ø,
    7,Ø : REM B2$           :REM*158
77Ø DATA 9,16,56,124,254,Ø,7,Ø,4
    ,Ø : REM UP ARROW       :REM*171
78Ø DATA 12,128,192,224,24Ø,224,
    192,128,Ø,4,Ø,7,Ø : REM RIGH
    T ARROW                 :REM*219
79Ø DATA 9,254,124,56,16,Ø,7,Ø,4
    ,Ø : REM DOWN ARROW     :REM*137
8ØØ DATA 12,16,48,112,24Ø,112,48
    ,16,Ø,4,Ø,7,Ø : REM LEFT ARR
    OW                      :REM*1Ø9
81Ø DATA 11,252,252,252,252,252,
    252,Ø,6,Ø,6,Ø : REM PLAYER 1
                            :REM*127
82Ø DATA 11,48,12Ø,252,252,12Ø,4
    8,Ø,6,Ø,6,Ø : REM PLAYER 2
                            :REM*69
83Ø DATA 22,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,
    Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,8,Ø,8,Ø
                            :REM*173
84Ø DATA 24,165,252,1Ø,1Ø,1Ø,1Ø,
    1Ø1,252,133,252,165,251,2Ø8,
    7,165,252,41,15,133,252,96,2
    4,165,252,16,1,56,42,133,252
    ,198,251,76,11,11       :REM*13
85Ø GRAPHIC1,1:SPRSAV1,Y$:LOCATE
    Ø,Ø:GSHAPEY$:SSHAPEY$,Ø,Ø,6,
    6:GETKEYA$:GRAPHICØ:END
                            :REM*185
86Ø PRINT"{SHFT CLR}{CRSR DN}"TA
    B(15)"GAME SETUP":PRINT"{2 C
    RSR DNs}{3 SPACEs}USE <- AND
     -> KEYS TO VIEW CHOICES":PR
    INT"{CRSR DN}{3 SPACEs}PRESS
     {CTRL 9}RETURN{CTRL Ø} TO L
    OCK IN SELECTION{2 CRSR DNs}
    ":X=1                   :REM*241
87Ø DO:READ A$ : IF A$="END" THE
    N RETURN : ELSE READ N
                            :REM*199
88Ø FORJ=1TON:READT$(J):NEXT:PRI
    NTTAB((4Ø-LEN(A$))/2)A$"{CRS
    R DN}":J=1              :REM*171
89Ø PRINTTAB((4Ø-LEN(T$(J))-2)/2
    )"{CTRL 9} "T$(J)" {CTRL Ø}{
    CRSR DN}{2 CRSR UPs}":GETKEY
    K$:K=ASC(K$)            :REM*231
9ØØ IF K=13 THEN94Ø         :REM*99
91Ø IF K=157 THEN BEGIN:J=J-1:IF
    J=ØTHENJ=N:BEND:GOTO89Ø
                            :REM*23
92Ø IF K=29 THEN BEGIN:J=J+1:IFJ
    >NTHENJ=1:BEND:GOTO89Ø
                            :REM*191
93Ø GOTO 89Ø                :REM*39
94Ø ON X GOTO 95Ø,96Ø,97Ø,98Ø,1Ø
    ØØ                      :REM*225
95Ø IF T$(J)="YES" THEN BEGIN:RE
    AD X$ :IFX$="END" THEN RETUR
    N:ELSE95Ø:BEND          :REM*15
96Ø BD=VAL(MID$(T$(J),1,1)):GOTO
    1Ø1Ø                    :REM*155
97Ø NM=VAL(T$(J)):GOTO1Ø1Ø
                            :REM*151
98Ø RR=1:IF J>1 THEN BEGIN : IF
    J=2 THEN RR=4:ELSE RR=Ø:BEND
                            :REM*89
99Ø GOTO1Ø1Ø                :REM*199
1ØØØ WF= ( T$(J)<>"YES"):REM*1Ø3
1Ø1Ø PRINT"{2 CRSR DNs}":X=X+1
                            :REM*2Ø9
1Ø2Ø LOOP                   :REM*179
1Ø3Ø TEMPO 17Ø:PLAY"CDEGREWG":FO
     RJ=1TO45Ø:NEXTJ:MC=Ø:RETURN
                            :REM*54
```

■

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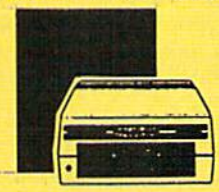

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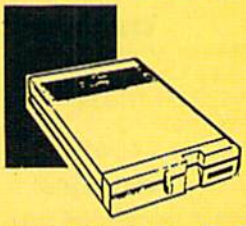

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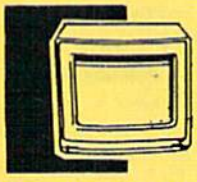

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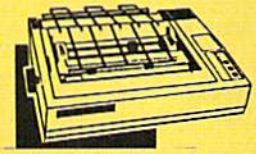

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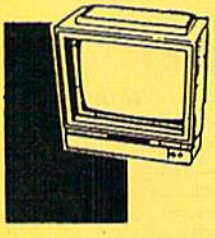

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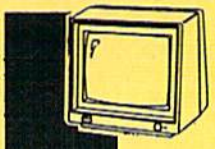

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Table 1 is a list of the functions I've included in the program. You'll find an English definition of each function and the abbreviation the program uses for it.

Program Design

I deliberately established several constraints in developing the program, to make it as independent and flexible as possible. First, although I could have added other capabilities through subroutines, I wanted to use only the DEF FN command so the program could be memory resident in Immediate mode.

Second, I could have reduced many of the formulas to one conversion number and represented the value of pi by the pi sign, but I deliberately left them in their equation form for learning purposes. For example, 180/3.141592654, which is used several times, could be simplified to 57.29577951. However, leaving it as is will remind—or inform?—you that 180 degrees is one-half of a circle, 3.141592654 is the value of pi, and the first divided by the second gives the number of degrees in one radian, a radian being the unit of measure of an angle at the center of a circle whose intercepted arc equals the circle's radius. Designing the functions this way displays their logical basis and helps the user learn.

My final programming constraint was to make the functions stand alone; that is, none of them reference previously defined functions. This way, you can type in only as many as you want, and you can execute any

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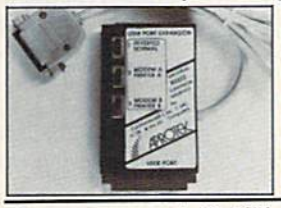

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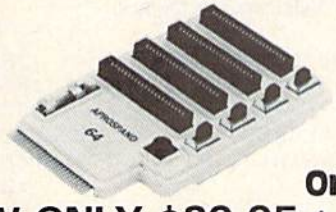

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function or group of functions without referencing the others.

Using the Program

Type in the program listing, including those functions that you'll need. Then run the program to enable the functions.

To use a function in Immediate mode, type PRINT and the function abbreviation in the Table, followed by a return. For example, to calculate the sine of 30 degrees, type PRINT FN SN(30) <return>. The value .5, which is the sine of 30 degrees, will appear on the screen.

To use a function in a program of your own, you must reference it with a DEF FN statement. Be sure to place these statements at the beginning of your program listing, so the functions are in place before the program needs them.

Keep in mind that you can use the functions only if they're in memory. If you enter a New command, your computer will lose its added mathematical capabilities. R

Table 1. *The 32 functions.*

Common logs (base 10)	FN CL(X)	Convert degrees to radians	FN DR(X)
Common antilogs (base 10)	FN AL(X)	Convert radians to degrees	FN RD(X)
Sine in degrees	FN SN(X)	Convert degrees to grads	FN DG(X)
Cosine in degrees	FN CS(X)	Convert grads to degrees	FN GD(X)
Tangent in degrees	FN TN(X)	Convert radians to grads	FN RG(X)
Arcsine in degrees	FN IS(X)	Convert grads to radians	FN GR(X)
Arccosine in degrees	FN IC(X)	Convert Celsius to Fahrenheit	FN FD(X)
Arctangent in degrees	FN IT(X)	Convert Fahrenheit to Celsius	FN CD(X)
Arcsine in radians	FN AS(X)	Convert millimeters to inches	FN IN(X)
Arccosine in radians	FN AC(X)	Convert inches to millimeters	FN MM(X)
Sine in grads	FN SI(X)	Convert liters to gallons	FN GA(X)
Cosine in grads	FN CO(X)	Convert gallons to liters	FN LI(X)
Tangent in grads	FN TA(X)	Convert kilograms to pounds	FN LB(X)
Arcsine in grads	FN RS(X)	Convert pounds to kilograms	FN KG(X)
Arccosine in grads	FN RC(X)	Convert grams to ounces	FN OZ(X)
Arctangent in grads	FN RT(X)	Convert ounces to grams	FN GR(X)

Address all author correspondence to Jerald A. Brown, 3319 Alice St., 2nd Floor, Erlanger, KY 41018.

Listing 1. *Thirty-two Math Functions program.*

```
100 REM **32 MATH FUNCTIONS**          :REM*42
110 REM **BY J. BROWN**                :REM*186
120 REM ----------                     :REM*122
125 REM-SINE IN DEGREES                :REM*227
130 DEF FN SN(X)=SIN(3.141592654*X/180)
                                       :REM*84
135 REM-COSINE IN DEGREES              :REM*59
140 DEF FN CS(X)=COS(3.141592654*X/180)
                                       :REM*248
145 REM-TANGENT IN DEGREES             :REM*75
150 DEF FN TN(X)=TAN(3.141592654*X/180)
                                       :REM*126
155 REM-ARCSINE IN RADIANS             :REM*161
160 DEF FN AS(X)=ATN(X/SQR(-X*X+1))    :REM*50
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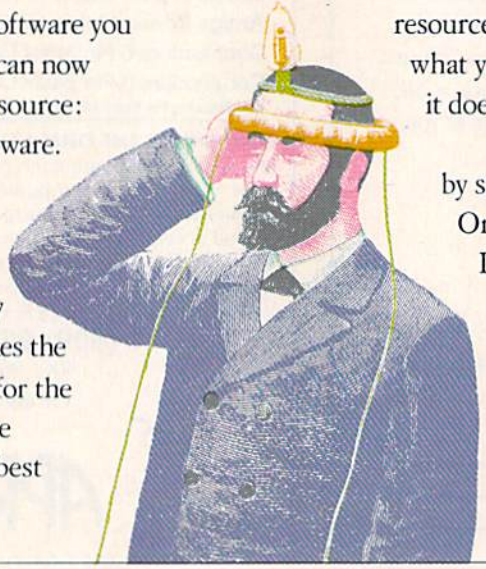

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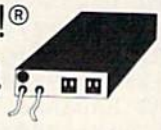

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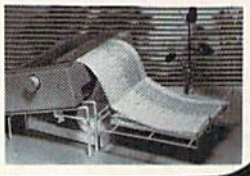

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```
165 REM-ARCCOSINE IN RADIANS          :REM*47
17Ø DEF FN AC(X)=-ATN(X/SQR(-X*X+1))+3.1415
    92654/2                           :REM*112
175 REM-ARCSINE IN DEGREES            :REM*99
18Ø DEF FN IS(X)=ATN(X/SQR(-X*X+1))*(18Ø/3.
    141592654)                        :REM*118
185 REM-ARCCOSINE IN DEGREES          :REM*249
19Ø DEF FN IC(X)=(-ATN(X/SQR(-X*X+1))+3.141
    592654/2)*(18Ø/3.141592654)       :REM*36
195 REM-ARCTANGENT IN DEGREES         :REM*31
2ØØ DEF FN IT(X)=ATN(X)*(18Ø/3.141592654)
                                      :REM*88
2Ø5 REM-SINE IN GRADS                 :REM*17
21Ø DEF FN SI(X)=SIN(X*3.141592654/2ØØ)
                                      :REM*2Ø6
215 REM-COSINE IN GRADS                :REM*9
22Ø DEF FN CO(X)=COS(X*3.141592654/2ØØ)
                                      :REM*146
225 REM-TANGENT IN GRADS              :REM*151
23Ø DEF FN TA(X)=TAN(X*3.141592654/2ØØ)
                                      :REM*246
235 REM-ARCSINE IN GRADS              :REM*155
24Ø DEF FN RS(X)=ATN(X/SQR(-X*X+1))*(2ØØ/3.
    141592654)                         :REM*8
245 REM-ARCCOSINE IN GRADS            :REM*49
25Ø DEF FN RC(X)=(-ATN(X/SQR(-X*X+1))+3.141
    592654/2)*(2ØØ/3.141592654)       :REM*122
255 REM-ARCTANGENT IN GRADS           :REM*87
26Ø DEF FN RT(X)=ATN(X)*(2ØØ/3.141592654)
                                      :REM*23
265 REM-CONVERT DEGREES TO RADIANS    :REM*72
27Ø DEF FN DR(X)=X*(3.141592654/18Ø):REM*73
275 REM-CONVERT RADIANS TO DEGREES :REM*188
28Ø DEF FN RD(X)=X*(18Ø/3.141592654)
                                      :REM*251
285 REM-CONVERT DEGREES TO GRADS      :REM*176
29Ø DEF FN DG(X)=X*(1Ø/9)             :REM*123
295 REM-CONVERT GRADS TO DEGREES       :REM*98
3ØØ DEF FN GD(X)=X*(9/1Ø)             :REM*111
3Ø5 REM-CONVERT RADIANS TO GRADS       :REM*88
31Ø DEF FN RG(X)=X*(2ØØ/3.141592654)
                                      :REM*151
315 REM-CONVERT GRADS TO RADIANS      :REM*194
32Ø DEF FN GR(X)=X*(3.141592654/2ØØ)
                                      :REM*141
325 REM-COMMON (BASE 1Ø) LOG          :REM*174
33Ø DEF FN CL(X)=LOG(X)/LOG(1Ø)       :REM*149
335 REM- COMMON (BASE 1Ø) ANTI-LOG    :REM*2Ø8
34Ø DEF FN AL(X)=1Ø{UP ARROW}X        :REM*125
345 REM-CONVERT CELCIUS TO FAHRENHEIT DEGRE
    ES                                :REM*122
35Ø DEF FN FD(X)=(9/5*X)+32           :REM*185
355 REM-CONVERT FAHRENHEIT TO CELCIUS DEGRE
    ES                                :REM*6Ø
36Ø DEF FN CD(X)=5/9*(X-32)           :REM*57
365 REM-CONVERT MILLIMETERS TO INCHES:REM*6
37Ø DEF FN IN(X)=X/25.4               :REM*95
375 REM-CONVERT INCHES TO MILLIMETERS
                                      :REM*226
38Ø DEF FN MM(X)=25.4*X               :REM*123
385 REM-CONVERT LITERS TO GALLONS      :REM*2
39Ø DEF FN GA(X)=X/3.78541            :REM*135
395 REM-CONVERT GALLONS TO LITERS      :REM*64
4ØØ DEF FN LI(X)=X*3.78541            :REM*219
4Ø5 REM-CONVERT KILOGRAMS TO POUNDS:REM*118
41Ø DEF FN LB(X)=X*2.2Ø4622622        :REM*123
415 REM-CONVERT POUNDS TO KILOGRAMS    :REM*6
42Ø DEF FN KG(X)=X/2.2Ø4622622        :REM*29
425 REM-CONVERT GRAMS TO OUNCES       :REM*2Ø
43Ø DEF FN OZ(X)=X/28.3495            :REM*217
435 REM-CONVERT OUNCES TO GRAMS       :REM*66
44Ø DEF FN GR(X)=X*28.3495            :REM*89
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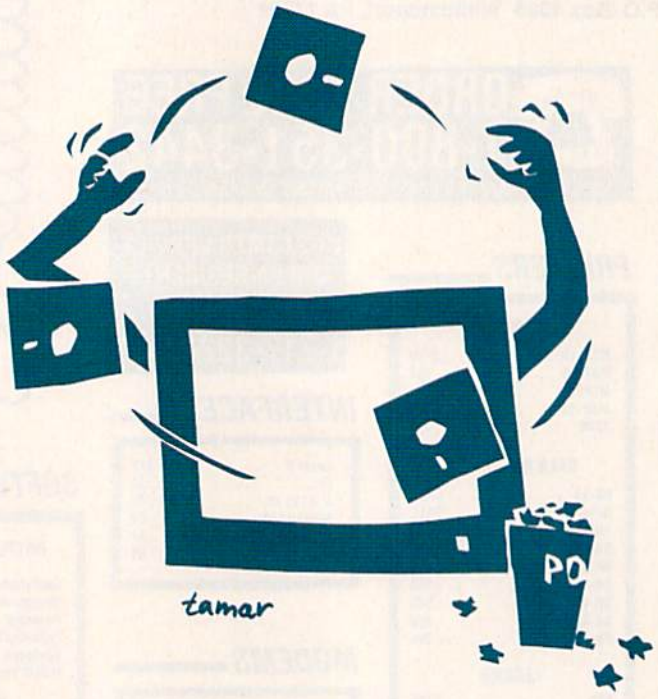
Take full advantage of the power of your C-128 RAM expander with this RAM disk program.



By M. GARAMSZEGHY

The 1700 and 1750 RAM expansion modules for the Commodore 128 provide 128K and 512K, respectively, of additional random access memory. Basic 7.0 provides the Stash, Fetch and Swap commands to transfer data to and from the expansion memory, and the latest version of C-128 CP/M (CP/M 3.0) fully supports the expanders as RAM disks (drive m:).

However, Basic 7.0 lacks a RAM Disk mode. Stash, Fetch and Swap are not "true" RAM disk commands, because they don't reset the various start- and end-of-file pointers required to store and retrieve Basic and machine language programs.

This simple yet powerful RAM disk program gives the C-128 true RAM disk capability. It lets you store up to two 64K Basic program files in the 1700 RAM expansion module or up to eight 64K files if you have the 1750 module.

Keep in mind that the storage is temporary, because any data stored in a RAM expander is lost when you turn the power to the computer off or press the reset button.

The RAM Disk 128 program installs itself as a device driver in an unused area of memory starting at address $1300 in bank 0. The cassette buffer at $0B00 becomes a RAM directory buffer. The RAM disk is assigned device number 1, and it can't be used in conjunction with a Datassette.

Once activated, RAM Disk 128 will usually remain in operation until you reset the system by turning off the power, pressing the reset button or entering a SYS 57344 or SYS 57416.

RAM Disk 128 intercepts calls to the Kernal Load and Save routines by changing the indirect jump vectors at $0330 and $0332. Control is routed back to the Kernal if the device number is 1; otherwise, RAM Disk 128 is directed to special Load/Save routines that access the RAM expander and reset the file pointers.

Each RAM block contains a directory entry, which consists of a filename, default load address and file length, in the first page of the block.

The direct memory access (DMA) process used by the RAM expansion controller (REC) chip works exclusively in Slow (1 MHz) mode. If RAM Disk 128 is called in Fast mode (2 MHz), it automatically switches the computer to Slow mode.

Putting the RAM Disk to Work

Operating RAM Disk 128 is easy. Listing 1 is a short Basic program that creates a machine language file called RAM Disk 128. Type in this program and save it to disk before running it. Once you've created the RAM Disk 128 machine language file, you can begin using it immediately.

To activate RAM Disk 128 from a cold start, first place the disk that contains the RAM Disk 128 file in your disk drive. Then, if your drive is a 1571, type BOOT "RAM DISK 128" <return>. If your drive is a 1541 or 1541-compatible, type BLOAD "RAM DISK 128" <return>, then SYS 4864 <return>. Either way, a message will appear telling you that RAM Disk 128 is active and what the RAM size is—128K or 512K. If no expander has been installed, an error message will appear. The RAM disk will instantly

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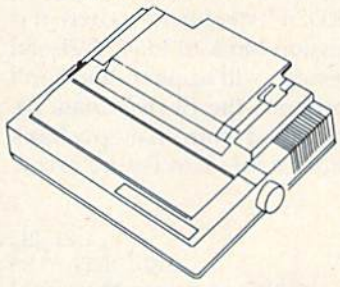

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"format" itself, and a Ready prompt will appear.

RAM Disk 128 is invisible when activated, and doesn't impair the normal disk input/output functions.

Saving Files

Since RAM Disk is assigned device #1, files are saved to it using a syntax that resembles saving to a Datassette. Just type SAVE"n:filename" <return> to save a file. In this statement, n is a number from 0 to 1 (for the 1700 expander) or 0 to 7 (for the 1750 expander) that corresponds to the bank in the expander where the file is to be stored. Note that only one file per bank is permitted. The filename is optional, since the bank number is adequate to identify the file. If n: is missing, a Syntax error will occur.

A Save operation will replace the existing contents of the bank being saved to, whether it's a RAM Disk 128 file or data written to the expander via Stash or Swap.

Deleting Files

Once a file has been placed in a RAM disk bank, it will remain until another file is saved to the bank. If you want to delete a file from the bank and leave the bank empty, clear the computer's memory with the New command. Then enter SAVE"n:" <return>, where n is the number of the bank to be deleted.

Loading Files

To load a file from the RAM disk, type LOAD"n" <return>, where n is the expansion bank to load. A ?Load Error message will appear, but don't worry about it—the file *will* load. Attempting to load from an empty bank will produce a File Not Found error.

You can display the directory entry for each bank by typing LOAD <return> or LOAD"$" <return>. If a bank number is not listed in the directory, that bank is empty. The directory will not overwrite a program in main memory, unlike the LOAD"$",8 command.

When you're using the RAM disk, you can't use BLoad and BSave with machine language programs. You must load and save these programs with a C-128 monitor designated as device #1.

Verify, Open, Print# and other file-handling functions are not implemented on the RAM disk, but they're still available for use with disk and serial bus input and output. ®

Address all author correspondence to M. Garamszeghy, 67 Callender St., Toronto, Ontario, Canada M6R 2H2.

Listing 1. *RAM Disk 128 program.*

```
5 PRINT"{SHFT CLR}RAM DISK 128":PRINT"{CRSR
   DN}BY M. GARAMSZEGHY"              :REM*223
1Ø CS=Ø:PRINT"{2 CRSR DNs}CREATING BOOT FIL
   E":PRINT"{2 CRSR DNs}PLEASE WAIT"
                                      :REM*1ØØ
2Ø FORI=4864TO5572:READX:POKEI,X:CS=CS+X:NE
   XT                                 :REM*162
3Ø IFCS<>71Ø25THENPRINT"{2 CRSR DNs}{CTRL 9
   }ERROR IN DATA STATEMENTS":END     :REM*1Ø8
4Ø PRINT"{2 CRSR DNs}WRITING BOOT FILE{2 CR
   SR DNs}":BSAVE"RAM DISK 128",BØ,P4864 TO
    P5572                             :REM*1Ø6
5Ø INPUT"ACTIVATE RAMDOS <Y/N>";Y$:IFY$="Y"
   THENSYS4864:END                    :REM*142
1ØØ DATA 169,71,141,2,223,173,2,223,2Ø1,71,
    24Ø,36,32,125,255,147,82,65,77    :REM*3Ø
11Ø DATA 32,68,73,83,75,32,32,78,79,84,32,6
    7,79,78,78,69,67,84,69,68,13,13:REM*124
12Ø DATA 1Ø,1Ø,1Ø,1Ø,1Ø,Ø,96,32,125,255,147
    ,82,65,77,45,68,79,83,32,86,69    :REM*198
13Ø DATA 82,32,49,46,48,13,1Ø,66,89,32,77,4
    6,71,65,82,65,77,83,9Ø,69,71,72:REM*146
14Ø DATA 89,1Ø,13,68,69,86,73,67,69,32,32,4
    9,13,1Ø,Ø,173,Ø,223,41,16,24Ø     :REM*52
15Ø DATA 13,32,125,255,53,49,5Ø,75,32,32,Ø,
    76,129,19,32,125,255,49,5Ø,56     :REM*116
16Ø DATA 75,32,32,Ø,32,125,255,73,78,83,84,
    65,76,76,69,68,13,1Ø,Ø,169,189    :REM*5Ø
17Ø DATA 141,26,3,169,239,141,27,3,169,136,
    141,28,3,169,241,141,29,3,169,6   :REM*3Ø
18Ø DATA 141,3Ø,3,169,241,141,31,3,169,76,1
    41,32,3,169,241,141,33,3,169,38   :REM*6Ø
19Ø DATA 141,34,3,169,242,141,35,3,169,6,14
    1,36,3,169,239,141,37,3,169,121:REM*172
2ØØ DATA 141,38,3,169,239,141,39,3,169,21,1
    41,48,3,169,21,141,49,3,169,151:REM*154
21Ø DATA 141,5Ø,3,169,21,141,51,3,162,2,173
    ,1,223,41,16,24Ø,2,162,8,142,17:REM*218
22Ø DATA 2Ø,16Ø,Ø,169,Ø,153,Ø,11,2ØØ,2Ø8,25
    Ø,162,Ø,169,128,32,176,21,232     :REM*176
23Ø DATA 236,17,2Ø,2Ø8,245,96,Ø,8,Ø,Ø,142,6
    ,223,141,1,223,169,Ø,141,2,223    :REM*12
24Ø DATA 141,4,223,141,5,223,141,7,223,169,
    1,141,8,223,169,11,141,3,223      :REM*14Ø
25Ø DATA 169,Ø,141,Ø,255,96,Ø,Ø,142,6,223,1
    41,1,223,173,52,11,141,2,223      :REM*64
26Ø DATA 173,53,11,141,3,223,169,Ø,141,4,22
    3,169,1,141,5,223,173,5Ø,11,141:REM*183
27Ø DATA 7,223,173,51,11,141,8,223,169,63,1
    41,Ø,255,169,Ø,141,Ø,255,96,Ø,Ø:REM*225
28Ø DATA Ø,56,165,175,229,194,141,51,11,56,
    165,174,229,193,176,3,2Ø6,51,11  :REM*87
29Ø DATA 141,5Ø,11,24,96,Ø,Ø,Ø,162,Ø,169,12
    9,32,2Ø,2Ø,16Ø,Ø,185,Ø,11,32      :REM*59
3ØØ DATA 21Ø,255,2ØØ,192,2Ø,2Ø8,245,169,13,
    32,21Ø,255,232,236,17,2Ø,2Ø8      :REM*189
31Ø DATA 227,169,255,96,Ø,Ø,Ø,Ø,165,186,2Ø1
    ,1,24Ø,3,76,78,245,32,112,2Ø      :REM*77
32Ø DATA 165,193,141,52,11,165,194,141,53,1
    1,165,183,24Ø,54,16Ø,1,166,199    :REM*91
33Ø DATA 32,174,247,2Ø1,58,2Ø8,43,16Ø,Ø,166
    ,199,32,174,247,153,Ø,11,2ØØ      :REM*213
34Ø DATA 196,183,2Ø8,245,169,32,153,Ø,11,2Ø
    Ø,192,32,2Ø8,248,165,185,41,1     :REM*35
35Ø DATA 141,54,11,56,173,Ø,11,41,15,2Ø5,17
    ,2Ø,144,3,76,121,21,17Ø,169,128:REM*189
36Ø DATA 32,58,2Ø,169,128,32,2Ø,2Ø,169,255,
    24,96,76,138,2Ø,76,125,21,173,Ø   :REM*59
37Ø DATA 255,76,1Ø8,242,165,183,24Ø,24Ø,16Ø
    ,Ø,166,199,32,174,247,2Ø1,36      :REM*159
38Ø DATA 2Ø8,3,76,138,2Ø,41,15,2Ø5,17,2Ø,14
    4,3,76,121,21,17Ø,169,129,32,2Ø:REM*2Ø3
39Ø DATA 2Ø,173,54,11,2Ø8,1Ø,165,45,141,52,
    11,165,46,141,53,11,173,Ø,11      :REM*149
4ØØ DATA 24Ø,33,41,15,17Ø,169,129,32,58,2Ø,
    24,173,5Ø,11,1Ø9,52,11,144,3      :REM*25
41Ø DATA 238,51,11,133,174,173,51,11,1Ø9,53
    ,11,133,175,76,155,243,169,4,56   :REM*33
42Ø DATA 96,169,11,56,96,133,255,165,186,2Ø
    1,1,24Ø,5,165,255,76,1Ø8,242      :REM*191
43Ø DATA 173,48,2Ø8,41,254,141,48,2Ø8,76,3Ø
    ,21,Ø,Ø,133,255,165,186,2Ø1,1     :REM*169
44Ø DATA 24Ø,5,165,255,76,78,245,173,48,2Ø8
    ,41,254,141,48,2Ø8,76,185,2Ø,Ø    :REM*79
45Ø DATA 133,255,134,254,173,48,2Ø8,41,254,
    141,48,2Ø8,165,255,166,254,76     :REM*91
46Ø DATA 2Ø,2Ø,Ø,Ø                    :REM*89
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By JOHN HUNDLEY

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One of the tasks I wanted to use my printer for, other than word processing, was to make mailing labels for my bills. I soon realized, however, that although there were several good label-making programs on the market and in the public domain, none of them fitted my needs. I could print out labels for a whole mailing list, but when I wanted a year's supply for just one name, I had to print one label and answer the prompt, "print another list?" 12 times.

After you type in the program and save it, run it, making sure your printer is on. After a couple of seconds, a menu will appear with a choice of several printers. Press the number next to the type of printer you are using.

Next, type in the name of the person or business you are mailing to. After you press the return key, you'll be prompted for the address. Although the city and state appear here on separate screens, they'll appear on the same line on the label.

The next prompt will ask for the number of line spaces between labels. You'll have to experiment to get the proper spacing. I use a Star SG-10 printer and input 11 spaces for a one-inch label. The Commodore printers won't need nearly that many spaces; in fact, you might start out trying only one or two.

The last prompt is for the number of copies you want. When the printing is finished, a bell will ring.

If your printer is not one of those I've included on the menu, try experimenting with others listed, or choose number five for "other." If you do choose "other," you may have to try different label widths to get the proper horizontal spacing. Monthly Labels should work with most printers. R

Address all author correspondence to John Hundley, PO Box 697, Pearland, TX 77584.

Listing 1. *Monthly Labels program.*

```
10 PRINT"{SHFT CLR}":POKE53281,0:POKE53280,
   0                                  :REM*82
20 PRINTTAB(12)"{7 CRSR DNs}MONTHLY LABELS"
                                      :REM*194
30 PRINT:FORI=1TO2000:NEXT            :REM*18
40 PRINT"{SHFT CLR}"                  :REM*30
50 PRINTTAB(6)"{2 CRSR DNs}WHICH PRINTER AR
   E YOU USING?"                      :REM*248
60 PRINT"{2 CRSR DNs}1. MPS 801,802,803,100
   0                                  :REM*194
70 PRINT"{2 CRSR DNs}2. STAR MICRONICS"
                                      :REM*84
80 PRINT"{2 CRSR DNs}3. OKIDATA"      :REM*90
90 PRINT"{2 CRSR DNs}4. BLUE CHIP"    :REM*106
100 PRINT"{2 CRSR DNs}5. OTHER"       :REM*238
110 GETP$:P=VAL(P$):IFP<1 ORP >5 THEN110
                                      :REM*252
120 ONP GOSUB450,470,490,470,510      :REM*98
130 INPUT"{SHFT CLR}{2 CRSR DNs}NAME";A$
                                      :REM*92
140 INPUT"{SHFT CLR}{2 CRSR DNs}STREET ADDR
   ESS";B$                            :REM*24
150 INPUT"{SHFT CLR}{2 CRSR DNs}CITY";C$
                                      :REM*144
160 INPUT"{SHFT CLR}{2 CRSR DNs}STATE & ZIP
   ";D$                               :REM*116
170 INPUT"{SHFT CLR}{2 CRSR DNs}HOW MANY SP
   ACES BETWEEN LABELS";L             :REM*44
180 INPUT"{SHFT CLR}{2 CRSR DNs}HOW MANY CO
   PIES";C                            :REM*98
190 PRINT"{SHFT CLR}"                 :REM*180
200 PRINTTAB(11)"{2 CRSR DNs}GET PRINTER RE
   ADY"                               :REM*234
210 GOSUB410                          :REM*196
220 CM$=","                           :REM*172
230 POKE198,0:WAIT198,1               :REM*210
240 REM ***OPEN PRINTER AND START PRINTING*
   **                                 :REM*160
250 PRINT"{SHFT CLR}":PRINTTAB(17)"PRINTING
   "                                  :REM*32
260 OPEN4,4:CMD4                      :REM*253
270 FORA=1TOC                         :REM*61
```

RUN It Right

C-64; printer

```
28Ø PRINTNS$NT$:PRINT"{2 SPACEs}"A$:PRINT"{
    2 SPACEs}"B$:PRINT"{2 SPACEs}"C$CM$;:PR
    INT" "D$                          :REM*181
29Ø PRINTRS$RT$RU$:FORI=1TOL:PRINT:NEXT:NEX
    T                                 :REM*245
3ØØ PRINT#4:CLOSE4:PRINT"{SHFT CLR}":PRINTT
    AB(16)"FINISHED"                  :REM*61
31Ø GOSUB41Ø                          :REM*41
32Ø POKE198,Ø                         :REM*233
33Ø GET K$                            :REM*1Ø9
34Ø REM ***SOUND THE BELL AFTER PRINTING***
                                      :REM*151
35Ø S=54272:POKES+24,15               :REM*147
36Ø POKES+1,11Ø:POKES+5,9             :REM*53
37Ø POKES+6,9:POKES+4,17              :REM*67
38Ø POKES+4,16:FORI=1TO5ØØ:NEXT       :REM*229
39Ø IFK$=""THEN33Ø                    :REM*157
4ØØ GOTO13Ø                           :REM*123
41Ø FORK=1TO19:PRINT:NEXT             :REM*29
42Ø PRINTTAB(14)"HIT ANY KEY"         :REM*223
43Ø POKE198,Ø:POKE198,1:RETURN        :REM*81
44Ø REM ***SET LINE SPACING ROUTINE***
                                      :REM*173
45Ø NS$=CHR$(15):NT$=""               :REM*127
46Ø RS$=CHR$(8):RT$="":RU$="":RETURN
                                      :REM*239
47Ø NS$=CHR$(27):NT$="2"              :REM*63
48Ø RS$=CHR$(27):RT$="A":RU$=CHR$(2):RETURN
                                      :REM*95
49Ø NS$=CHR$(27):NT$="6"              :REM*91
5ØØ RS$=CHR$(27):RT$="%":RU$=CHR$(4):RETURN
                                      :REM*67
51Ø NS$=CHR$(13):NT$=""               :REM*183
52Ø RS$="":RT$="":RU$="":RETURN       :REM*23Ø
```

■

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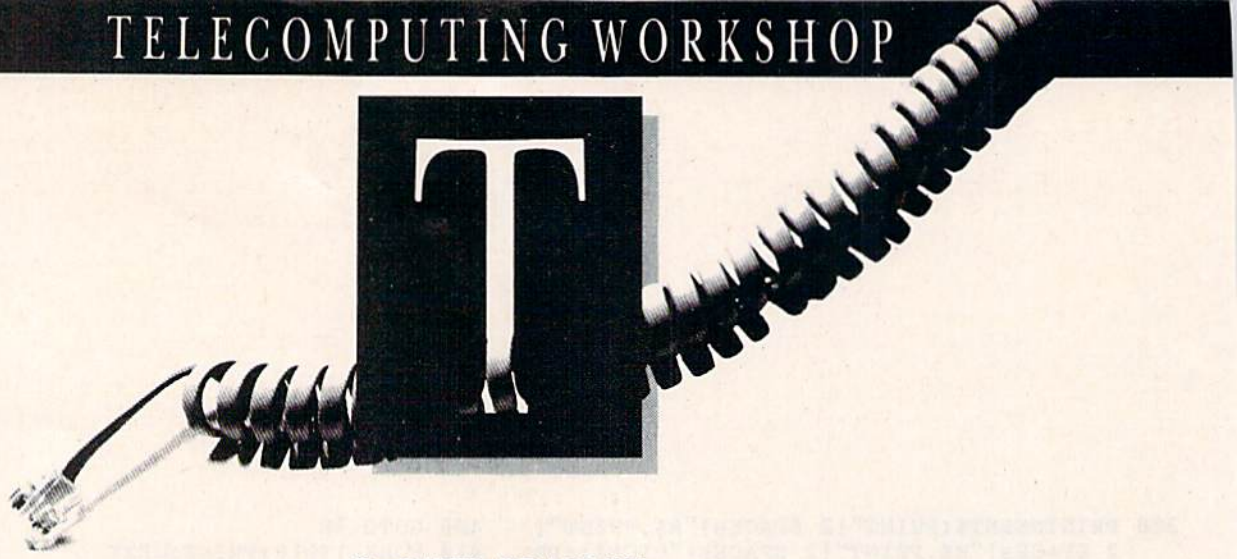


By DAVID BRADLEY

Telecomputing Workshop is a monthly column dedicated to the needs of RUN *readers who are using, or intend to use, a Commodore computer for telecommunications. We invite you to submit your questions to:*

David Bradley
Telecomputing Workshop
c/o RUN *magazine*
80 Elm St.
Peterborough, NH 03458

Questions will be selected for publication on the basis of probable interest to the majority of readers and will be answered only through this column.

I'll start off this month with a few quick notes on various topics.

In the September column, I suggested that a reader use a program called REL-SEQ CONV.Z to convert his relative files to sequential files so that he could upload them to CompuServe. Another program, called Lynx, will do the trick, too. Versions 6 and higher should make your relative files transferable.

Also in the September workshop, Richard Miller asked if there were a static discharge trap for phone lines, like the one he uses on the antenna of his ham radio equipment. In December, I referred him to such a device, and this month Russell K. Prater, of Parker, Florida, has informed me of another. It's from Radio Shack (part #43-102), and it costs less than $15. In addition, reader A. Hughes suggests one way to deal with the problem in this month's Commodore Clinic.

In October, I said I'd let you know if I came across any good 128-mode, 80-column terminal programs. Michael Arighi was kind enough to tell me about Nezterm, a program in this category. You should be able to get Nezterm on Q-Link, from Public Domain Solutions (PO Box 832, Tallevast, FL 34270) for $5, or perhaps from your local user's group or BBS.

In November, I mentioned the Toronto Pet Users Group (TPUG) as a good place to get Higgyterm for the Commodore Plus/4 computer. Since then, however, the group has changed its address. The new address is TPUG, Inc., 5300 Yonge St., Willowdale, Ontario, Canada M5N 5R2. You must be a member of TPUG to order programs from their library. Membership dues are about $25 in U.S. funds.

Ellen Rule of Contoocook, New Hampshire, wrote to share a strange problem she encountered, along with the solution she discovered. She had been using her Total Telecommunications modem with its accompanying software for months without any trouble. It also worked fine with Q-Link's special software. One day, for no apparent reason, the modem wouldn't work with anything but Q-Link.

Changing modems didn't help the situation, so she decided that the problem had to be in the software. But how could that be? It was working just fine before. Then she remembered that the telephone company in her area had just changed its computer system. She tried a different terminal program, and all was fine again.

Here's a question for you to ponder. Richard E. Ott says that sometimes his 1670 modem won't work if his printer is on; at other times, it won't work if the printer is off. He has an Epson RX-80 printer with a Cardco-G+ interface. What could be causing this? The only thing I can suggest is that it depends on the order in which things are turned on. Does anyone have any other thoughts?

I'm looking for a cheap modem so I can access Q-Link. Do you have any suggestions?

Johnny Moon
Broxton, GA

Many inexpensive (under $30) modems are available, including the Commodore 1600 VicModem. You should be able to get a modem in your price range from one of the number of companies that advertise in *RUN*.

I have a C-128, and I'm trying to use the telecommunications program IMP-C8.BIN (which is available from Commodore and can be found on CompuServe's CPMSIG) to access the Dow Jones News Service through Tymnet. The problem is that whenever Dow Jones finishes sending me something, the cursor goes to the home position on the screen, forcing me to overwrite information that has been displayed. The program works fine on CompuServe, and I have used Vidtex on Dow Jones with no problem. Do you have any suggestions?

Robert Kupfer
Sturbridge, MA

You might try accessing Dow Jones from another location with a different C-128. The best way to isolate a problem in a case like this is to do exactly the same thing using different hardware. If the problem persists, you know it's in the software. If the problem goes away, you have to start swap-

ping individual hardware items until you find the troublemaker. You also might try using another service besides Tymnet. If you can, inform the person or persons who wrote IMP-C8.BIN of your troubles.

I recently purchased my first modem, a Total Telecommunications unit, through Q-Link. The booklet that came with the modem instructed me to unhook my fast-load cartridge, printer and second disk drive when using the modem, but doesn't say why. What problems will result if I don't follow this procedure? Could I disable my Epyx Fast Load instead of removing it? Should I be unhooking everything when logging onto local BBSs?

Cameron G. Moore, Jr.
St. Petersburg, FL

I tried using Q-Link with an Epyx Fast Load in place. I disabled the cartridge, had my printer on and set my second 1541 disk drive to device 9. I was able to get on line, and I didn't experience any difficulties for the first half-hour, during which I uploaded one file and downloaded two others. Then everything locked up on my third download attempt. I had to disconnect by turning off my C-64.

In most cases, directions are put in manuals because they're important to your success. If the directions work, don't try to "fix" the product or find a way to make it stop working. Just use it and enjoy!

I have a C-64 with a Seikosha SP-1000VC printer and a HesModem II modem. I'm having trouble printing when using the modem. The screen displays letters in both uppercase and lowercase, but when I print from the buffer, the printout gets confused. The uppercase letters are printed as graphics characters, and the lowercase letters are printed as uppercase.

I've contacted the people who sold me the modem, and they've made several suggestions, but the problem persists. What can I do to correct this? Is it the modem, the software or the printer that's causing the problem?

Ray Crowell
Boise, ID

It sounds as though your terminal program is at fault. The Seikosha SP-1000VC will print in uppercase and lowercase if you open the file to the printer with a secondary address of 7 (such as OPEN 4,4,7). If the file is in Basic, you should be able to alter the Open statement in the program and thus solve the problem.

If the program can't be edited, you can try another terminal program. Of course, if you're satisfied with everything else your terminal program does, this isn't the most convenient solution.

Another thing you could do is save everything you capture in your buffer to disk and use a different program to print the sequential file(s) later. Public Domain Solutions (see address in the fourth paragraph of this column, above) has a program called E-Z.Seq.Read on their November 1986 monthly disk that can do this with the Seikosha SP-1000VC. Or you can type in the following program and give it a try. It's not the fastest, but it worked for me.

```
0 POKE 53280,0: POKE 53281,0
10 PRINT CHR$(5),CHR$(8),CHR$(14),
   CHR$(147)
20 PRINT "NAME OF SEQ FILE TO
   PRINT";: INPUT FP$
30 FP$ = FP$ + ",S,R"
40 OPEN 1,8,3,FP$
50 OPEN 4,4,7
60 GET#1, G$
70 IF G$ = CHR$(34) THEN G$ =
   CHR$(17): GOTO 100
80 IF ST <> 0 THEN CLOSE 1: PRINT#4:
   CLOSE4: PRINT "DONE!": END
90 PRINT G$
100 PRINT#4, G$
110 GET AB$
120 IF AB$ = "A" THEN CLOSE 1:
    PRINT#4: CLOSE4: PRINT
    "ABORTED!": END
130 GOTO 60
```

I've heard rumors that PaperClip II for the C-128 will have a telecommunications section in it. Is this true? If so, what will it support?

Bob White
North Bay, Ontario, Canada

Yes, it's true. I recently spoke to Steve Douglas (the author of PaperClip II) about the telecommunications section and was able to find out some interesting tidbits. For example, with this program you'll press the no-scroll key to enter or exit the terminal option.

The program has a buffer, variable baud rates, Xmodem and Punter protocols, autodialing, a phone book and much more. It also has an option to save the terminal configuration you need. This means you won't have to reset all the parameters manually every time you use the program. All you'll have to do is load your file, and you'll be ready to go.

The following modems are supported: 1600, 1650, 1660, Mitey Mo, HesModem II, 1670 and Hayes. For more information about PaperClip II for the C-128, contact your local dealer or Batteries Included, 30 Mural St., Richmond Hill, Ontario, Canada L4B 1B5; 416-881-9941.

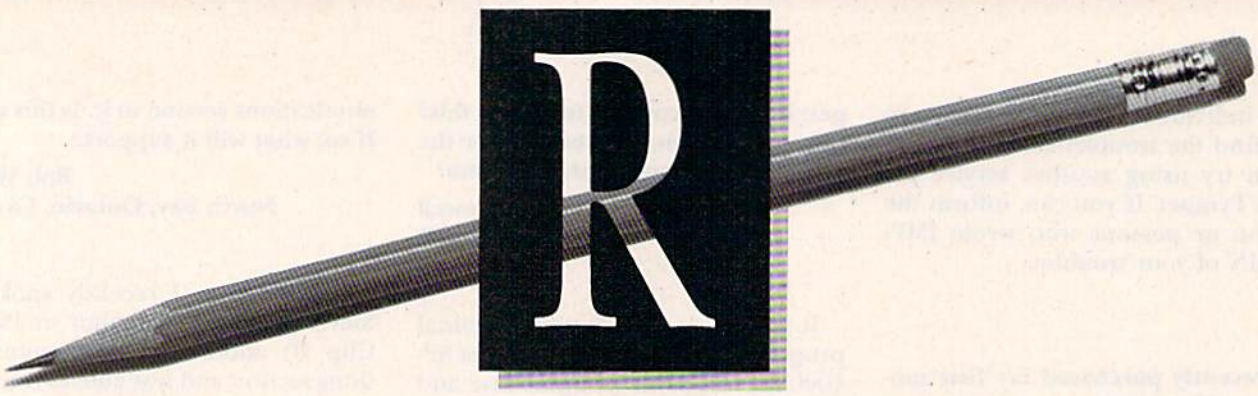
Tips of the Month

—If your terminal program has an option that lets you save your terminal configuration to disk under a filename of your choice, you can save time—and eliminate typing errors—by using a one-character name.

—In purchasing a modem, keep in mind that if it is *machine-specific*, you'll have to buy a different one if you ever change machines. Instead, better buy a modem that you can use with just about any computer; you can then upgrade to any system without added expense.

A Personal Note

Early in 1986 I met a wonderful woman named Jane Parris on Delphi. After getting to know each other over the past year, we've decided to get married. I'm not suggesting that this is the best way to find that special someone, but it certainly worked for us! ■



By MARGARET MORABITO

In many of our nation's schools, the mainstream student population is benefiting from the use of computers (of whatever brand) and the current wealth of educational software. But, what about our handicapped and special-needs students who cannot speak, see, or move their arms and legs? Do they also share in this wealth?

The answer, unfortunately, is, "Not yet." There are several reasons for this lack of support. Many parents and schools cannot afford the special equipment that is promoted for the handicapped. Furthermore, input devices and software written for special-needs students are very costly.

The expense could be reduced considerably, however, if people would only realize that low-cost computers, such as the C-64 and VIC-20, can do as much, if not more, than the high-priced equipment.

Special input devices can also be made for the C-64 and VIC-20 (with a little help from your friends) for only about $5 in parts. While there is not a huge library of commercial software to fit the requirements of handicapped users, there is a growing body of public domain software that is written specifically for Commodore computers.

Inexpensive computers like the Commodore can be a significant contribution to the education of handicapped and special-needs students.

Programmer Don Peterson

Let me introduce Don Peterson, a retired electronics engineer, now living in Tempe, Arizona, who has embarked on a second career. For three years, he has been involved in developing C-64 and VIC-20 software programs for the education of the handicapped. He also is skilled at constructing and modifying input devices for students with special needs.

Don has so far written over 60 programs specifically for severely handicapped users. His first endeavor was a writing program that allows the selection and input of keyboard characters through an on-off switch controlled by the foot or chin. The characters are printed on the screen until a sentence or phrase is completed, at which time the phrase can either be spoken by a speech synthesis program or printed to a printer.

This program is now being used in all of the private schools in Peterson's area. Eighteen-year-old Holly Waite, who is voiceless and severely physically handicapped, was the first school student to use Don's writing and speaking program.

Says Peterson, "My program literally turned that girl's life around. She was 18 years old; she was very bright, but had no way of communicating." Since Holly met Don in 1985, she has learned to write letters and to speak through the computer, and she even has plans to write a book.

Don has written variations of this program to accommodate the blind. A five-year-old boy who is blind, mute and afflicted with cerebral palsy uses a program that speaks to the child, who then selects the characters he wishes to print to the screen or a printer.

Another program allows a person with no voice and very limited movement to make a telephone call. This program allows for chatting and for communicating pre-recorded messages with the use of a speech synthesizer.

Peterson has also written a spelling program that can speak the words to a blind user. A word is displayed on the screen and spoken; then the user spells the word by selecting characters with the on-off switch. This is a variation of the flash method of spelling that I discussed last month.

Five-year-old Billie Carpenter was unable to speak or see. Now, through the use of Don Peterson's "I want" program, she can communicate her needs and desires. The program has a series of menus, from which she can make selections by pulling and push-

ing on a joystick, enabling her to "say" 32 sentences.

The Software's Requirements

To start with, there is no sophisticated and expensive hardware involved. The concept involves a switch that plugs into the joystick port and takes the place of a joystick fire-button. Peterson's engineering background has been helpful; he buys the necessary parts and then modifies them himself to accommodate the particular needs of the students he works with.

The signal the student transmits through the switch is incorporated as input into the software program. Students can control the on-off switch mechanism with a finger, the side of a hand, the chin or the toe. The switch can be modified so that even just a puff of air blown into an amplifier can trigger it.

Peterson uses a Radio Shack on-off foot switch (part #44-610) that costs $2.99. It is a 2½-inch square box that can be modified as needed by removing springs to make it easier for the student to control and by adding a foam rubber pad for attaching under the chin.

He has also built keyboard plates for children who can use one finger or a head stick to press the keys. These plates overlie the keyboard and assist the user's aim in hitting a particular key. Peterson built eight of these keyboard plates, which are commercially available for $100 each, in one afternoon for a total cost of only $5!

"Almost everything on the market in this business is terribly expensive," says Peterson. "A $3000 dedicated computer doesn't do a tenth of what I'm doing with the Commodore 64."

For the sightless students, a voice synthesizer (either disk- or cartridge-based) is needed so that the computer can speak. Don Peterson has been using two speech synthesizers for the C-64 and VIC-20 that are no longer being produced, but there are still available copies of one of them, the SAMS program.

Several other speech synthesizers, listed at the end of this article, are currently on the market. Peterson's programs can be modified to work with these synthesizers.

VIC-20 users will be happy to know that there is a speech synthesizer being made for that valuable computer. It is produced by Talk Tronix, Inc. from El Toro, California. (See address at end of article.)

A Battery-Operated VIC-20

It is rather easy to create a battery-operated VIC-20 that can be attached to a wheelchair. For example, five-year old Billie Carpenter, who is learning to talk and print with her VIC-20 using Don's programs, has also been able to take her computer to school on her wheelchair, enabling her to communicate more easily.

The VIC-20 comes with a nine-volt transformer. All you need is a 12-volt battery and a nine-volt regulator. You can get the latter for about $2. Many people already have the 12-volt battery to run their wheelchairs.

How To Get Don's Programs

Although his retirement community has donated some money to help him with his hardware and software development, Don Peterson is still running his non-profit operation on a shoestring. He is becoming more involved with demonstrating to individuals and to schools in his area how useful the C-64 and VIC-20 are for enabling severely handicapped people to communicate and learn. He is also undertaking the development of software for the mentally retarded who may not be physically handicapped.

Don is providing all of his programs *free* to anyone who wants them. He has also generously donated the programs to QuantumLink, so that those users can download directly from the network. You can get his entire library on two disks by writing to: Donald Peterson, 2645 E. Southern A326, Tempe, AZ 85282. He asks only $3 per disk to cover the cost of the disk and mailing. He can be reached by phone at 602-831-3519.■

If you're using Commodore computers for educational purposes (at home or in school) and would like to share your experiences through The Resource Center, write me a letter detailing the equipment you're using, subject areas being taught, grade level or age of your students, software that you're using and any other information you feel like including.

Also, if you'd like to donate public domain educational programs to The Resource Center for sharing with other educators or parents, please send along a disk with a brief description of the program. Send correspondence and disks to:

Margaret Morabito
The Resource Center
c/o RUN *magazine*
80 Elm St.
Peterborough, NH 03458

You can also leave mail in my on-line mail boxes: CompuServe (70616,714) or QuantumLink (MARGM).

Table 1. *Speech synthesizer manufacturers.*

VIC-20 synthesizer
Talk Tronix, Inc.
27341 East Ridge Drive
El Toro, CA 92630
714-768-4220

Voice Master ($89)
Covox, Inc.
675-D Conger St.
Eugene, OR 97402
503-342-1271

Hearsay 1000 ($79.95)
Hearsay, Inc.
1825 74th St.
Brooklyn, NY 11204
718-232-7266

Comvoice ($99)
Personal Speech System ($395)
Votalker ($99)
Votrax, Inc.
1394 Rankin
Troy, MI 48093
313-588-2050

Magic

From p. 12.

mode and save the program to cure this problem. Or, if you recognize the keywords as they are entered in 128 mode, just type a Z between the first two letters. Basic will ignore the Z but will *not* tokenize the keyword.

Robert Irving
Northridge, CA

$3A0 Speedy C-128 sprites—My trick speeds up sprite animation on the C-128. By poking values directly into memory locations used by Basic to store speed information, a sprite can have a speed between 0 and 255. Enter this line in Direct mode to start a sprite moving:

```
SPRITE 1,1,1:MOVSPR1,45#15
```

Notice the speed of the sprite and then enter:

```
POKE 4478,35
```

This tells Basic to give the sprite a speed of 35. There is a limit to how fast a sprite can move without showing up at several locations on the screen at the same time. Try different values to see which work best for you. The memory locations needed to speed up the other sprites are as follows:

Sprite 1: 4478	Sprite 4: 4511	Sprite 7: 4544
Sprite 2: 4489	Sprite 5: 4522	Sprite 8: 4555
Sprite 3: 4500	Sprite 6: 4533	

David A. Dye
Phoenix, AZ

$3A1 Long C-64 lines—There are obvious advantages in using a C-128 to develop C-64 programs. But I've got a useful trick you may not be aware of.

In 128 mode, you can type up to 160 characters on each program line. This is helpful with long data sections and conditional clauses, and it can lead to fantastic "one-liners."

Once you've finished developing your program, save it. Now comes the surprise. Load it in 64 mode—the program will run perfectly. Of course, such lines can then only be changed in 128 mode. You can also use this trick in reverse to edit long lines entered on a C-64 by using keyword abbreviations.

Gerhard Schilling
Hemet, CA

$3A2 Solo labels—If you need to print just one address label and don't want to bother with loading the database, try this easy-to-use program. Just follow the prompts. Use the run-stop/restore combination when you're finished with the program.

Because this is an input/output program, you cannot use commas, colons or semicolons in your data unless you begin the text with quotes. You also have to set your own print tabs for the printer you have (see your printer manual for details).

```
10 REM ONE LABEL-MARK GALLOWAY
20 INPUT"{SHFT CLR}{CTRL N}{2 CRSR DNs}NAME
   {6 SPACEs}";N$
30 INPUT"ADDRESS{3 SPACEs}";AD$
40 INPUT"CITY/STATE";CT$
50 INPUT"ZIP CODE{2 SPACEs}";ZP$
60 PRINT"{2 CRSR DNs}IS THIS CORRECT? (Y/N)
   "
70 GET A$:IF A$=""GOTO 70
80 IF A$="Y" GOTO 100
90 IF A$="N" GOTO20
100 OPEN 3,4
110 CMD3:PRINT:PRINTN$
120 PRINTAD$:PRINTCT$"{2 SPACEs}"ZP$
130 PRINT#3:CLOSE3:GOTO20
```

Mark C. Galloway
Bedford Hills, NY

$3A3 C-128 hi-res screen saver—The August Magic contains a trick ($31A) that shows you how to save a text screen on the C-128. Until now, this utility couldn't save a hi-res screen.

First, draw your picture on the hi-res screen, and save it with:

```
BSAVE"screen",P7168 TO P16383
```

To recall it, set up the proper graphic mode with the Graphic command and type:

```
BLOAD"screen"
```

Voila!—there's your picture. Each picture will occupy 37 blocks on your disk.

Chad Oliver
St. Anne, IL

$3A4 Universal note-maker—You can make a mini word processor by entering text as program lines. Use a Poke to remove the line numbers when you're ready to print out or to just display it on the screen. First type in your message just like a Basic program, with line numbers. Don't worry about syntax; just don't begin your lines with REM. The following line works with the C-64, VIC-20, Plus/4 and C-16, but you cannot use shifted characters in this "word processor" since Basic will ignore them.

```
POKE22,35:OPEN4,4:CMD4:LIST:PRINT#4:CLOSE4:POKE22,25
```

For the C-128, change the values to POKE24,37 and POKE24,27, respectively.

Mark A. Hermann
Park Ridge, IL

$3A5 C-64 at first sprite—If you use sprites in your programs, you may have noticed that when you first display a sprite, it flashes momentarily below the position you have set and then corrects itself. This happens once to each sprite when it's initially displayed. To prevent this, use the following line at the start of your program:

```
10 POKE 53269,255:POKE 53269,0
```

This turns all eight sprites on and off, forcing the video chip to complete its initialization. Since the position registers point off screen initially, there is no visible effect, but when you're ready to display a sprite, it appears in the right place immediately.

Lou Goldstein
Flushing, NY

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ACCESS
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Magic

**$3A6 Sidewinder**—My one-liner scrolls a message (A$) across the top of the screen, showing 36 characters at a time. Add a few blank spaces at the beginning of A$ to more easily read the message.

```
Ø REM SCREEN SCROLL-MIKE FRANDSEN
1 A$="{23 SPACEs}LINE 1Ø IS A ONE LINER THA
  T WILL PRINT A$ AT THE "
2 A$=A$+"TOP OF THE SCREEN AND SCROLL THE M
  ESSAGE AS YOU READ IT.{2 SPACEs}THE 5Ø CA
  N "
3 A$=A$+"BE CHANGED TO ALLOW A FASTER OR SL
  OWER DELAY.{2 SPACEs}CURSOR DOWNS CAN BE
  "
4 A$=A$+"ADDED AFTER THE HOME TO MOVE THE M
  ESSAGE DOWN."
9 :
1Ø FORA=1TOLEN(A$):PRINT"{HOME}":FORI=1TO5Ø
  :NEXTI:PRINT"{2 SPACEs}"MID$(A$,A,36)" "
  :NEXTA
```

Mike Frandsen
Missoula, MT

$3A7 Custom characters on Star printers—Although the user manual accompanying Star printers is clearly written, one point is barely mentioned. When you're defining your own characters, dip switch number five *must* be turned off. Turn the printer off, push dip switch number five to the off position and then turn the printer back on (see the dip switch section of your manual for your particular model). Now your characters will turn out fine!

Mike Dryja
Washington, MI

$3A8 C-64 screen mapper—If your printer uses Commodore graphics, this menu-driven program will print both screen and color memory maps with numbered grids of 40 columns by 25 rows for screen locations 1024–2023 and color locations 55296–56295. It also prints screen layout grids for plotting column and row coordinates.

```
1Ø REM SCREEN MAP PRINTER-J.R.CHARNETSKI
2Ø PRINT"{SHFT CLR}{CRSR DN} 1-SCREEN MEMOR
   Y{HOME}{2 CRSR DNs} 2-COLOR MEMORY{HOME}
   {3 CRSR DNs} 3-SCREEN LAYOUT{HOME}{4 CRS
   R DNs} 4-END{CRSR DN}"
3Ø GETA$:A=VAL(A$):ON-(A<1ORA>4)GOTO3Ø:ONAG
   OTO4Ø,5Ø,6Ø:PRINT"{SHFT CLR}":END
4Ø X=1Ø24:T$="SCREEN MEMORY MAP":GOTO7Ø
5Ø X=55296:T$="COLOR MEMORY MAP":GOTO7Ø
6Ø X=Ø:T$="SCREEN LAYOUT"
7Ø PRINTA:M=25:S$=" ":OPEN4,4:PRINT#4
8Ø PRINT#4,SPC(39-(LEN(T$)/2));T$
9Ø PRINT#4,SPC(19);:B$="{4 SPACEs}":FORJ=1T
   O4
1ØØ PRINT#4,"Ø123456789";:NEXT:PRINT#4
11Ø PRINT#4,SPC(13)RIGHT$(B$+STR$(X)+S$,6);
   :FORI=1TO4Ø:PRINT#4,"{SHFT O}";:NEXT
12Ø PRINT#4,"{COMD G}";:IFX<MTHENX=X+1:GOTO
   14Ø
13Ø X=X+4Ø:PRINT#4,MID$(STR$(X-1),2);
14Ø PRINT#4,CHR$(8):C=C+1
15Ø PRINT#4,CHR$(15);:IFC<MGOTO11Ø
```


Circle 147 on Reader Service card.

```
16Ø PRINT#4,SPC(19);:FORI=1TO4Ø:PRINT#4,"{C
    OMD T}";:NEXT:PRINT#4:CLOSE4:RUN
```

Joseph R. Charnetski
Dallas, PA

$3A9 Device present check—The following short program works with any Commodore computer and will detect if the disk drive and/or printer is on. You can modify it to wait until the device is turned on to avoid incurring a Device Not Present error in your program.

```
1Ø REM DEVICE CHECK-STEPHEN FREITAG
2Ø OPEN15,8,15:CLOSE15:REM DRIVE
3Ø IF ST=Ø THEN PRINT"DRIVE IS ON":GOTO5Ø
4Ø PRINT"DRIVE IS OFF"
5Ø OPEN15,4,15:CLOSE15:REM PRINTER
6Ø IF ST=Ø THEN PRINT"PRINTER IS ON":END
7Ø PRINT"PRINTER IS OFF"
```

Stephen Freitag
Sauquoit, NY

$3AA C-128 DatafileReportMail—Mike Konshak's Datafile program can be improved on the C-128 by appending the DFReport and DFMail programs to the Datafile program. This is easily accomplished with a few changes.

First load Datafile. Then type the following line in Direct mode (without a line number) to set the "beginning" of the load:

```
Z=65278-FRE(0):POKE 45,ZAND255:POKE 46,Z/256
```

Next, load the DFReport program in the normal manner. Move the cursor up to the line above and press return again. Finally, load DFMail. The programs are now appended into one long program, but you must type the following line to restore the pointer to the start of the Datafile program:

```
POKE 45,1:POKE 46,28
```

Next, use the Delete command to delete lines 508–516 and 1010–1018 (be careful!). Now make the following changes

```
1 REM "C-128 {SHFT D}ATAFILE{SHFT R}EPORT{S
  HFT M}AIL-ED WILLIAMS
382 GOTO1ØØØ
384 GOTO5ØØ
636 IFC$="E"THENPRINT#4:CLOSE4:GOTO 1Ø
638 IFC$="M"THENPRINT#4:CLOSE4:GOTO1ØØØ
1124 IFC$="E"THENPRINT#4:CLOSE4:GOTO1Ø
1126 IFC$="R"THENPRINT#4:CLOSE4:GOTO5ØØ
```

and save the new program. You'll no longer have to access the disk drive when you want to use DFReport or DFMail; they'll always be in memory when you want them!

Ed Williams
Walkerville, MT

$3AB Sonatina in C-128—The following program plays the "Sonatina in C," by Mozart. I translated it for the C-128.

```
1Ø REM SONATINA IN C-JESSE B BROWN
2Ø TEMPO 24:PLAY"V1O4TØU11XØ":PLAY"V2O3T5U1
   1XØ"
3Ø A$="V1O5WCV2Ø3QCQGQEQGM V1O5HE V2O3QBQG
   V1O5QG V2O3QEQGM V1O4.HB V2O3QDQGQFQG V1
```

→

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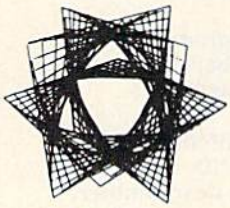

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Magic

Listing continued.

```
   O5ICIDM V1O5WC V2O3QCQGQEQGM"
4Ø B$="V1O5WB V2O3QCQAQFQAM V1O5HG V2O3QCQG
   V1O6HDV2O3QEQGM V1O5HG V2O2QBO3QGQD V1O
   5IGIFIE V2O3QG V1O5IFM V1O5WE V2O3QCQGQE
   QGM"
5Ø C$="V1O4QA V2O3QFQRHR V1O4QBO5QCQDQEQFQG
   M V2O3QF V1O5QAQGQFQE V2O3QAAF V1O5QDQCO
   4QBQA V2O3QAMQE V1O4QGQAQB V2O3QRHR V1O5
   QCQDQEQFM"
6Ø CC$="V2O3QE V1O5QGQFQEQD V2O3QGQE V1O5QC
   O4QBQAQGM"
7Ø D$="V2O3QD V1O4QFQGQA V2O3QRHR V1O4QBO5Q
   CQDQEM V2O3QD V1O5QFQEQDQC V2O3QFQD V1O4
   QBQAQGQF V2O3QFMQC V1O4QEQGV2O3QG V1O4.Q
   CV2O3QE V1O4.QC V2O3QG V1O4.QCM"
8Ø DD$="V1O4.HC V2O3QEQGQCQR V1O4QRM"
9Ø PLAY A$+B$:PLAY C$+CC$:PLAY D$+A$:PLAY B
   $+C$:PLAY CC$+D$:PLAY DD$
```

Jesse B. Brown
Eunice, LA

$3AC Charming music—I've converted the "Snake Charmer" theme to C-128 music format in the following program. I hope you'll find it "charming" also.

```
1Ø REM SNAKE CHARMER-JESSE B BROWN
2Ø ENVELOPE 3,3,Ø,14,4,Ø:TEMPO 27
3Ø PLAY "V1O4T3U13XØ":PLAY"V2O3T9U6XØ":PLAY
   "V3T9O3U6XØ"
4Ø A$="V2HR V1O4QDQEM V2O3WA V3O3WD V1O4HFH
   EM V2O3WA V3O3WD V1O4HDQDQEM V2O3WA V3O3
   WD V1O4QFQAQEQFM V2O3WA V3O3WD V1O4HDQDQ
   EM"
5Ø B$="V2O3WA V3O3WD V1O4HFHEM V2O3WA V3O3W
   D V1O4HDQDQEM V2O3WA V3O3WD V1O4QFQAQEQF
   M V2O3WA V3O3WD V1O4HDQFQGM"
6Ø C$="V2O3WA V3O3WD V1O4QAQAQAQAM V2O3WA V
   3O3WD V1O4QAQGQEQFM V2O3WA V3O3WD V1O4QG
   QGQGQGM V2O3WA V3O3WD V1O4QGQFQDQEM"
7Ø D$="V2O3WA V3O3WD V1O4HFHEM V2O3WA V3O3W
   D V1O4HDQDQEM V2O3WA V3O3WD V1O4QFQAQEQF
   M V2O3HA V3O3HD V1O4HDM"
8Ø PLAY A$+B$:PLAY C$+D$
```

Jesse B. Brown
Eunice, LA

$3AD C-128 Run command—When you edit a Basic line in your efforts to debug a C-64 program, all the variables are lost, which can be quite bothersome. The C-128 has two 64K banks of memory, and Basic 7.0 stores the program and variables separately. Therefore, when you edit a Basic 7.0 program line, the variables in memory are not affected. This can be a valuable, time-saving feature when you're debugging.

Rick Sellers
Little Rock, AR

**$3AE C-128 ML bank switching**—The table below gives the value to store in the memory management unit—MMU ($FF00) to change banks in machine language. You should be in "common" memory when you use this method, or your program will try to continue at the next location in the new bank.

Bank	Value	Bank	Value	Bank	Value
$0	$3F	$6	$96	$B	$EA
$1	$7F	$7	$D6	$C	$06
$2	$BF	$8	$2A	$D	$0A
$3	$FF	$9	$6A	$E	$01
$4	$16	$A	$AA	$F	$00
$5	$56				

Ben Kranich
Warren, MI

$3AF Saving your customized RUN Script 64—I've enjoyed using RUN Script 64, and I've used the Parameter Setting program with it many times. It's a little inconvenient, though, because it won't save the modified RUN Script file onto the same disk. Since the old version needs to be scratched before saving the new version, I added the following line:

```
895 OPEN15,8,15,"S0:RUNSCRIPT":CLOSE15
```

Now the Parameters program scratches the old file before saving the new version. Be sure to follow the instructions for the Parameter Setting program. Now making changes is much easier!

James Hallman
Owensboro, KY

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Circle 69 on Reader Service card.

KONSHAK *From p. 58.*

Listing 1 continued.

```
   CTRL 8}"                    :REM*96
96 GOSUB3Ø:IFA$="A"THENGOSUB35Ø:
   IFFL=ØTHEN124               :REM*46
98 IFA$="M"THENGOSUB354:IFFL=ØTH
   EN244                       :REM*226
1ØØ IFA$="D"THENGOSUB354:IFFL=ØT
   HEN272                      :REM*32
1Ø2 IFA$="C"THEN36             :REM*8Ø
1Ø4 IFA$="R"THEN17Ø            :REM*222
1Ø6 IFA$="P"THEN358            :REM*86
1Ø8 IFA$="V"THENGOSUB354:IFFL=ØT
   HEN192                      :REM*146
11Ø IFA$="W"THENGOSUB35Ø:IFFL=ØT
   HEN144                      :REM*84
112 IFA$="S"THENGOSUB354:IFFL=ØT
   HEN3Ø4                      :REM*18
114 IFA$="Q"THEN342            :REM*118
116 IFA$="@"THEN462             :REM*4
117 IFA$="$"ORA$="4"THENGOSUB422
   :GOTO68                     :REM*99
118 IFFL<>ØTHENFL=Ø:GOTO68
                               :REM*146
12Ø GOSUB6Ø2:GOTO96            :REM*162
122 :                          :REM*98
124 FORI=X+1TOR:PRINT"{SHFT CLR}
   {COMD 6} PRESS THE {CTRL 2}{
   CTRL 9}RETURN{CTRL Ø}{COMD 6
   } KEY AFTER EACH ENTRY"
                               :REM*24
126 PRINT" PRESS {CTRL 9}{CTRL 2
   }RETURN{COMD 6}{CTRL Ø} WITH
   OUT ANY ENTRY TO STOP{CTRL 8
   }{CRSR DN}"                 :REM*156
128 PRINT" {CTRL 9}RECORD NUMBER
    ";I;"{CRSR DN}"            :REM*23Ø
13Ø FORN=1TOF                  :REM*154
132 PRINTF$(N)SPC(S1-LEN(F$(N)))
   "{3 SPACEs}>{3 CRSR LFs}";:I
   NPUTREC$(I,N)               :REM*5Ø
133 IFREC$(I,N)=""THENREC$(I,N)=
   ">"                         :REM*41
134 IFLEN(REC$(I,N))>L%(N)THENGO
   SUB14Ø:GOTO132              :REM*178
135 IFREC$(I,N)="="THENREC$(I,N)
   =REC$(I-1,N)                :REM*237
136 IFREC$(I,1)=">"THEN X=I-1:CK
   =1:GOTO68                   :REM*2Ø
138 NEXTN:K%(I)=I:NEXTI:X=R:CK=1
   :GOTO68                     :REM*42
14Ø PRINT" {CTRL 9}{COMD 3}CANNO
   T EXCEED"STR$(L%(N))" CHARAC
   TERS{CTRL Ø}{CTRL 8}":GOSUB6
   Ø2:RETURN                   :REM*142
142 :                          :REM*118
144 PRINT"{SHFT CLR}{COMD 6}ENTE
   R NAME OF CURRENT FILE TO BE
    SAVED"                     :REM*218
146 PRINT"(12 CHARACTERS MAX).{2
    SPACEs}ANY EXISTING FILE"
                               :REM*2Ø8
148 PRINT"WITH THE SAME NAME WIL
   L BE SCRATCHED.{2 CRSR DNs}{
   CTRL 8}"                    :REM*214
15Ø PRINT"{2 SPACEs}";NF$:INPUT"
   {CRSR UP}";NF$:IFNF$=""THEN6
   8                           :REM*22Ø
152 OPEN15,8,15:PRINT#15,"S Ø:DF]
    "+LEFT$(NF$,8)+".BAK":GOSUB
   414:IFET=8THEN68            :REM*178
154 PRINT#15,"R Ø:DF] "+LEFT$(NF$
   ,8)+".BAK=DF] "+NF$:GOSUB414
   :IFET=8THEN68               :REM*246
156 OPEN5,8,5,"Ø:DF] "+NF$+",S,W
   ":GOSUB414:IFET=8THEN68
                               :REM*Ø
158 PRINT#5,R;CR$;F;CR$;X:FORN=1
   TOF:PRINT#5,F$(N);CR$;L%(N):
   NEXTN                       :REM*14Ø
159 GOSUB414:IFET=8THEN68:REM*45
16Ø FORI=1TOX:PRINT"{COMD 6}{CRS
   R DN} SAVING RECORD #{CTRL 8
   }"I"{2 CRSR UPs}"           :REM*88
162 FORN=1TOF:PRINT#5,REC$(K%(I)
   ,N):NEXTN:NEXTI:PRINT:GOSUB4
   14:IFET=8THEN68             :REM*168
166 CLOSE5:CLOSE15:CK=Ø:GOTO68
                               :REM*246
168 :                          :REM*144
17Ø IFCK<>ØTHENGOSUB394:IFA$<>"N
   "THEN68                     :REM*21Ø
171 PRINT"{SHFT CLR}{COMD 6} AVA
   ILABLE FILES ON DISK ARE:{CT
   RL 8}":@"$Ø:DF]*"           :REM*253
172 CLR:GOSUB16:PRINT"{CRSR DN}{
   COMD 6} ENTER NAME OF FILE T
   O BE LOADED{2 CRSR DNs}{CTRL
    8}":INPUTNF$               :REM*118
173 IFNF$=""THEN68             :REM*255
174 OPEN15,8,15:OPEN5,8,5,"Ø:DF]
    "+NF$+",S,R":GOSUB414:IFET=
   8THEN68                     :REM*2Ø6
175 IFEN=62THENGOSUB416:GOTO68
                               :REM*1Ø5
176 INPUT#5,R,F,X:GOSUB414:IFET=
   8THEN68                     :REM*142
177 GOSUB24:GOSUB26:FORN=1TOF:IN
   PUT#5,F$(N),L$:L%(N)=VAL(L$)
                               :REM*125
178 NEXTN:GOSUB414:IFET=8THEN68
                               :REM*78
179 FORI=1TOX:K%(I)=I:PRINT"{COM
   D 6}{CRSR DN}LOADING RECORD
   #{CTRL 8}"I"{2 CRSR UPs}"
                               :REM*143
18Ø FORN=1TOF:INPUT#5,REC$(I,N):
   NEXTN                       :REM*116
182 NEXTI:PRINT:GOSUB414:IFET=8T
   HEN68                       :REM*96
184 S=ST:IFS<>ØTHEN188         :REM*126
188 CLOSE5:CLOSE15:GOTO61:REM*54
19Ø :                          :REM*166
192 I=1                        :REM*144
194 IFI=ØTHENI=X               :REM*92
196 IFI>XTHENI=1                :REM*6
198 PRINT"{SHFT CLR} {CTRL 9}REC
   ORD NUMBER:"STR$(I)"{2 SPACE
   s}FILE:"NF$"{CRSR DN}"
                               :REM*42
2ØØ FORN=1TOF:PRINT"{COMD 6}"F$(
   N)SPC(S1-LEN(F$(N)))" {CTRL
   8}"REC$(K%(I),N):NEXTN
                               :REM*76
2Ø2 PRINT"{CRSR DN} {CTRL 2}{CTR
   L 9}N{COMD 6}{CTRL Ø}EXT{4 S
   PACEs}{CTRL 2}{CTRL 9}L{COMD
    6}{CTRL Ø}AST{4 SPACEs}{CTR
   L 2}{CTRL 9}J{COMD 6}{CTRL Ø
   }UMP{4 SPACEs}{CTRL 2}{CTRL
   9}F{COMD 6}{CTRL Ø}IND"
                               :REM*124
2Ø3 PRINT" {CTRL 2}{CTRL 9}M{COM
   D 6}{CTRL Ø}ODIFY{2 SPACEs}{
   CTRL 2}{CTRL 9}D{COMD 6}{CTR
   L Ø}ELETE{2 SPACEs}{CTRL 2}{
   CTRL 9}P{COMD 6}{CTRL Ø}RINT
   {3 SPACEs}{CTRL 2}{CTRL 9}E{
   COMD 6}{CTRL Ø}XIT{CTRL 8}"
                               :REM*115
2Ø4 GOSUB3Ø:IFA$="N"THENI=I+1:GO
   TO194                       :REM*12
2Ø6 IFA$="L"THENI=I-1:GOTO194
                               :REM*96
2Ø7 IFA$="M"THENGOSUB256:GOTO198
                               :REM*247
2Ø8 IFA$="J"THEN216            :REM*118
2Ø9 IFA$="D"THENGOSUB284:GOTO198
                               :REM*1Ø1
21Ø IFA$="F"THEN218            :REM*15Ø
212 IFA$="E"THEN68             :REM*218
213 IFA$="P"THENOPEN4,4:PRINT#4,
   "RECORD#"I"IN FILE: "NF$:PRI
   NT#4:GOTO215                :REM*31
214 GOSUB6Ø2:GOTO2Ø4           :REM*188
215 FORN=1TOF:PRINT#4,REC$(K%(I)
   ,N):NEXTN:PRINT#4:PRINT#4:CL
   OSE4:GOTO2Ø4                :REM*75
216 INPUT"{CRSR DN}{COMD 6} JUMP
    TO RECORD NUMBER{CTRL 8}";I
   :GOTO194                    :REM*1Ø2
218 PRINT"{SHFT CLR}{4 SPACEs}{C
   TRL 9}FIND RECORDS WITH COMM
   ON ITEMS {CRSR DN}" :REM*134
22Ø FORN=1TOF:PRINT" {CTRL 2}{CT
   RL 9}";N;"{COMD 6}{CTRL Ø} "
   ;F$(N):NEXTN                :REM*82
222 INPUT"{CRSR DN}{COMD 6} WHIC
   H FIELD IS TO BE SEARCHED{CT
   RL 8}? Ø {4 CRSR LFs}";SF:IF
   SF=ØTHEN68                  :REM*166
224 IFSF<1ORSF>FTHENPRINT"{3 CRS
   R UPs}":GOTO222             :REM*144
226 PRINT"{COMD 6} ENTER {CTRL 9
   }COMMON ITEM{CTRL Ø} ":PRINT
   " (THE ENTIRE STRING IS NOT
   REQUIRED){CTRL 8}"          :REM*38
228 PRINT"{CRSR DN}{CTRL 9}";F$(
   SF);"{CTRL Ø} ";:INPUTT$:IFT
   $=D$THEN68                  :REM*182
23Ø J=I:FORI=1TOX:PRINT"{COMD 6}
   {CRSR DN} SEARCHING RECORDS{
   CTRL 8}"I"{2 CRSR UPs}"
                               :REM*16
232 IFT$=LEFT$(REC$(K%(I),SF),LE
   N(T$))THEN236               :REM*214
234 GOTO241                    :REM*12
236 J=I:PRINT"{SHFT CLR} RECORD
   #";I;"{CRSR DN}"            :REM*18
237 FORN=1TOF:PRINT"{COMD 6}"F$(
   N)SPC(S1-LEN(F$(N)))" {CTRL
   8}"REC$(K%(I),N):NEXTN
                               :REM*113
238 PRINT"{CRSR DN} {CTRL 2}{CTR
   L 9}N{COMD 6}{CTRL Ø}EXT{2 S
   PACEs}{CTRL 2}{CTRL 9}M{COMD
    6}{CTRL Ø}ODIFY{2 SPACEs}{C
   TRL 2}{CTRL 9}D{COMD 6}{CTRL
    Ø}ELETE{2 SPACEs}{CTRL 9}{C
   TRL 2}E{CTRL Ø}{COMD 6}XIT{C
   TRL 8}":GOSUB3Ø:IFA$="E"THEN
   198                         :REM*26
239 IFA$="M"THENGOSUB256:GOTO236
                               :REM*3
24Ø IFA$="D"THENGOSUB284:GOTO236
                               :REM*112
241 NEXTI:I=J:GOTO198          :REM*69
242 :                          :REM*218
244 PRINT"{SHFT CLR}{COMD 6} MOD
   IFY WHICH RECORD? ENTER {CTR
   L 2}{CTRL 9}#{CTRL Ø}{COMD 6
   } OR {CTRL 2}{CTRL 9}A{COMD
   6}{CTRL Ø}LL{2 CRSR DNs}{CTR
   L 8}"                       :REM*216
245 INPUTMR$:IFMR$=D$THEN68
                               :REM*145
246 IFMR$="A"THENMR$=D$:GOTO254
                               :REM*38
248 I=VAL(MR$):MR$=D$          :REM*248
25Ø IFI>XTHENGOSUB348:GOTO244
                               :REM*158
252 GOSUB256:GOTO68            :REM*214
254 FORI=1TOX:GOSUB256:PRINT"{CR
   SR DN} {CTRL 9}{CTRL 2}N{CTR
   L Ø}{COMD 6}EXT OR {CTRL 9}{
   CTRL 2}E{COMD 6}{CTRL Ø}XIT{
   CTRL 8}":GOSUB3Ø:IFA$="E"THE
   N68                         :REM*242
255 NEXTI:GOTO68               :REM*211
256 PRINT"{SHFT CLR}{COMD 6} TO
   MODIFY RECORD #{CTRL 8}";I;"
   {COMD 6}, MAKE CHANGES"
                               :REM*163
258 PRINT" AS EACH FIELD IS DISP
   LAYED, THEN {CTRL 2}{CTRL 9}
   RETURN{CTRL Ø}{CRSR DN}{CTRL
    8}":FORN=1TOF              :REM*179
```

→

Listing 1 continued.

```
26Ø PRINT"{COMD 6}"F$(N)" {CTRL
    8}":PRINT"{3 SPACEs}";REC$(K
    %(I),N)                 :REM*61
261 IFLEN(REC$(K%(I),N))>36THENP
    RINT"{CRSR UP}";        :REM*2Ø
262 PRINT"{CRSR UP} ";:INPUTREC$
    (K%(I),N)               :REM*161
264 IFLEN(REC$(K%(I),N))>L%(N)TH
    ENGOSUB14Ø:GOTO26Ø      :REM*141
265 IFREC$(K%(I),N)="="THENREC$(
    K%(I),N)=REC$(K%(I-1),N)
                            :REM*38
266 IFREC$(K%(I),N)=""THENREC$(K
    %(I),N)=">"             :REM*127
267 IFLEFT$(REC$(K%(I),N),1)=">"
    THENREC$(K%(I),N)=">":REM*12
268 NEXTN:CK=1:RETURN       :REM*161
27Ø :                       :REM*247
272 PRINT"{SHFT CLR}{COMD 6} DEL
    ETE WHICH RECORD? ENTER {CTR
    L 2}{CTRL 9}#{COMD 6}{CTRL Ø
    } OR {CTRL 2}{CTRL 9}A{COMD
    6}{CTRL Ø}LL{2 CRSR DNs}{CTR
    L 8}"                   :REM*181
274 INPUTDR$:IFDR$=D$THEN68
                            :REM*93
276 IFDR$="A"THENDR$=D$:GOTO282
                            :REM*165
278 I=VAL(DR$):DR$=D$:IFI>XTHENG
    OSUB348:GOTO274         :REM*1Ø1
28Ø GOSUB284:GOTO68         :REM*227
282 FORI=1TOX:GOSUB284:PRINT"{CR
    SR DN} {CTRL 9}{CTRL 2}N{CTR
    L Ø}{COMD 6}EXT OR {CTRL 9}{
    CTRL 2}E{CTRL Ø}{COMD 6}XIT{
    CTRL 8}":GOSUB3Ø:IFA$="E"THE
    N68                     :REM*21
283 NEXTI:GOTO68            :REM*24Ø
284 PRINT"{SHFT CLR}{COMD 6} TO
    DELETE RECORD NUMBER{CTRL 8}
    ";I;"{COMD 6}, PRESS":REM*19
286 PRINT" {CTRL 2}{CTRL 9}SHIFT
    {CTRL Ø} {CTRL 9}D{CTRL Ø}{C
    OMD 6}, PRESS {CTRL 2}{CTRL
    9}SPACE BAR{CTRL Ø}{COMD 6}
    TO ADVANCE{CTRL 8}{CRSR DN}"
                            :REM*123
288 FORN=1TOF:PRINT"{COMD 6}"F$(
    N)SPC(S1-LEN(F$(N)))" {CTRL
    8}"REC$(K%(I),N):NEXTN
                            :REM*165
29Ø GOSUB3Ø:IFA$="{SHFT D}"THEN2
    94                      :REM*1Ø7
292 CK=1:RETURN             :REM*181
294 PRINT"{2 CRSR DNs}DELETING R
    ECORD";I:PRINT"{CRSR DN}{CTR
    L 9}RECORDS MAY NOW BE OUT O
    F ORDER"                :REM*113
296 FORN=1TOF:REC$(K%(I),N)=REC$
    (X,N):REC$(X,N)="":NEXTN
                            :REM*157
298 FORJ=1TOX:IFK%(J)=XTHENK%(J)
    =K%(X):K%(X)=Ø:X=X-1:GOTO292
                            :REM*69
3ØØ NEXTJ                   :REM*137
3Ø2 :                       :REM*23
3Ø4 PRINT"{SHFT CLR} {CTRL 9}{3
    SPACEs}SORT RECORDS IN ASCEN
    DING ORDER{3 SPACEs}{CRSR DN
    }"                      :REM*157
3Ø6 FOR N=1TOF:PRINT" {CTRL 9}";
    N;"{CTRL Ø} ";F$(N):NEXTN
                            :REM*197
3Ø8 FORN=ØTO5:S(N)=Ø:NEXTN
                            :REM*197
31Ø N=Ø:PRINT"{CRSR DN}{COMD 6}
    ENTER {CTRL 9}{CTRL 2}Ø{CTRL
     Ø}{COMD 6} TO EXIT FIELD SE
    LECTION"                :REM*123
312 N=N+1:IFN=6THEN32Ø      :REM*213
314 PRINT"{COMD 6} # {CTRL 9}{CT
    RL 2}"N"{COMD 6}{CTRL Ø}FIEL
    D TO BE SORTED{CTRL 8}? Ø {4
     CRSR LFs}";:INPUTS(N):IFS(1
    )=ØTHEN68               :REM*237
316 IF(S(N)>F)OR(S(N)<Ø)THENPRIN
    T"{2 CRSR UPs}":GOTO314
                            :REM*163
318 IFS(N)<>ØTHEN312        :REM*27
32Ø PRINT"{CRSR DN} SORTING..."
                            :REM*221
322 L=R+1:SYS51526,L,X,F,S(1),S(
    2),S(3),S(4),S(5),S(Ø),REC$(
    1,S(1))                 :REM*235
324 FORI=1TOX:K%(I)=I:NEXT
                            :REM*45
326 CK=1:GOTO68             :REM*249
333 :                       :REM*54
334 PRINT"{SHFT CLR}{2 CRSR DNs}
     {COMD 3}{CTRL 9}YOU HAVE NO
    T SAVED YOUR CHANGES!{CTRL 8
    }"                      :REM*71
336 PRINT"{2 CRSR DNs}{COMD 6} D
    O YOU REALLY WANT TO QUIT? {
    COMD 3}{CTRL 9}Y{COMD 6}{CTR
    L Ø} OR {CTRL 2}{CTRL 9}N{CT
    RL Ø}{CTRL 8}           :REM*1Ø3
338 GOSUB3Ø:IFA$="Y" THEN344
                            :REM*253
34Ø GOTO68                  :REM*177
342 IFCK<>ØTHEN334          :REM*2Ø1
344 PRINT"{SHFT CLR}{2 CRSR DNs}
    DATAFILE TERMINATED":END
                            :REM*2Ø7
346 :                       :REM*67
348 PRINT" {COMD 3}NO SUCH RECOR
    D EXISTS{CTRL 8}":RETURN
                            :REM*215
35Ø IFR>ØTHENRETURN         :REM*115
352 PRINT"{HOME} {COMD 3}{CTRL 9
    }{4 SPACEs}NO RECORDS OR FIL
    ES IN MEMORY{5 SPACEs}{CTRL
    8}{CTRL Ø}"             :REM*227
353 FORI=1TO5ØØ:NEXTI:FL=1:RETUR
    N                       :REM*88
354 IFX>ØTHENRETURN         :REM*167
355 GOSUB352:RETURN         :REM*164
356 :                       :REM*77
358 IFCK<>ØTHENGOSUB394:IFA$<>"N
    "THEN68                 :REM*143
36Ø PRINT"{SHFT CLR} {CTRL 9}{4
    SPACEs}TRANSFER TO PRINTING
    PROGRAMS{5 SPACEs}"     :REM*29
362 PRINT"{CRSR DN}{COMD 6}PUT {
    CTRL 8}DATAFILE{COMD 6} DISK
     IN DRIVE, TRANSFER TO:"
                            :REM*27
364 PRINTTAB(6)"{CRSR DN}{CTRL 9
    }{CTRL 2}P{CTRL Ø}{CTRL 8} D
    FPRINT{2 SPACEs}{COMD 6}REPO
    RTS-LABELS-LISTS"       :REM*157
366 PRINTTAB(6)"{CRSR DN}{CTRL 9
    }{CTRL 2}C{CTRL Ø}{CTRL 8} D
    FCALC{3 SPACEs}{COMD 6}CALCU
    LATED REPORTS"          :REM*133
368 PRINTTAB(6)"{CRSR DN}{CTRL 9
    }{CTRL 2}E{CTRL Ø}{COMD 6}XI
    T TO MAIN MENU{CTRL 8}
                            :REM*97
37Ø PRINT"{CRSR DN} {CTRL 9}{6 S
    PACEs}PRESS THE APPROPRIATE
    KEY{7 SPACEs}"          :REM*23
372 GOSUB3Ø:IFA$="E"THEN68
                            :REM*15
374 IFA$="C"THENPRINT"{SHFT CLR}
    {CTRL 1}LOAD"CHR$(34)"DFCALC
    "CHR$(34)",8":GOTO38Ø:REM*63
376 IFA$="P"THENPRINT"{SHFT CLR}
    {CTRL 1}LOAD"CHR$(34)"DFPRIN
    T"CHR$(34)",8":GOTO38Ø
                            :REM*69
378 GOSUB6Ø2:GOTO372        :REM*1Ø5
38Ø PRINT:PRINT:PRINT:PRINT:PRIN
    T"RUN{CTRL 8}"          :REM*119
382 POKE631,19:POKE632,13:POKE63
    3,13:POKE634,13:POKE635,13:P
    OKE636,13               :REM*53
384 POKE198,6:NEW:END       :REM*153
392 :                       :REM*113
394 PRINT"{SHFT CLR}{CRSR DN} {C
    OMD 3}{CTRL 9}THIS WILL DEST
    ROY THE FILE IN MEMORY!{CTRL
     8}"                    :REM*183
396 PRINT"{2 CRSR DNs}{COMD 6} S
    AVE THE FILE FIRST? {CTRL 2}
    {CTRL 9}Y{COMD 6}{CTRL Ø} OR
     {COMD 3}{CTRL 9}N{CTRL 8}{C
    TRL Ø}":GOSUB3Ø:RETURN
                            :REM*47
4ØØ :                       :REM*121
4Ø2 PRINT"{SHFT CLR}{CRSR DN}{CO
    MD 3} THIS WILL ERASE THE DI
    SK!{CTRL 8}"            :REM*5
4Ø3 PRINT"{CRSR DN}{COMD 6} ARE
    YOU SURE? {COMD 3}{CTRL 9}Y{
    CTRL Ø}{COMD 6} OR {CTRL 2}{
    CTRL 9}N{CTRL Ø}{CTRL 8}
                            :REM*162
4Ø4 GOSUB3Ø:IFA$="N"THEN68
                            :REM*119
4Ø6 IFA$<>"Y"THEN68         :REM*119
4Ø7 PRINT"{CRSR DN}{COMD 6} PRES
    S {CTRL 2}{CTRL 9}RETURN{CTR
    L Ø}{COMD 6} WITHOUT AN ENTR
    Y TO EXIT{CTRL 8}"      :REM*9Ø
4Ø8 INPUT"{CRSR DN} {CTRL 9}DISK
     NAME,ID{CTRL Ø}";HN$,ID$:IF
    HN$=D$THEN68            :REM*125
41Ø OPEN15,8,15:PRINT#15,"NEWØ:"
    +HN$+","+ID$:GOSUB414:IFET=8
    THEN462                 :REM*29
411 CLOSE15:GOTO462         :REM*9Ø
412 :                       :REM*133
414 INPUT#15,EN,EM$,ET,ES:IF(EN<
    2Ø)OR(EN=62)THENET=Ø:RETURN
                            :REM*69
416 PRINT"{CRSR DN} {CTRL 9}{COM
    D 3}DISK ERROR{CTRL Ø}"EN"{C
    RSR LF}, "EM$","ET"{CRSR LF}
    ,"ES"{CTRL 8}":ET=8 :REM*111
418 PRINT"{CRSR DN}{COMD 6} PRES
    S {CTRL 2}{CTRL 9}ANY KEY{CT
    RL Ø}{COMD 6} TO RETURN TO M
    ENU{CTRL 8}":GOSUB3Ø:CLOSE5:
    CLOSE15:RETURN          :REM*131
42Ø :                       :REM*141
422 PRINT"{SHFT CLR}":@"$":PRINT
    TAB(25)"PRESS {CTRL 2}{CTRL
    9}ANY KEY{CTRL Ø}{COMD 6}":G
    OSUB3Ø:RETURN           :REM*97
46Ø :                       :REM*181
462 PRINT"{SHFT CLR}{CTRL 8} {CT
    RL 9}{9 SPACEs}DISK COMMANDS
     MENU{11 SPACEs}"       :REM*131
464 PRINTTAB(11)"{CRSR DN}{CTRL
    9}{CTRL 2}${COMD 6}{CTRL Ø}
    DISK DIRECTORY          :REM*131
466 PRINTTAB(11)"{CRSR DN}{CTRL
    9}{CTRL 2}F{COMD 6}{CTRL Ø}O
    RMAT A BLANK DISK       :REM*59
468 PRINTTAB(11)"{CRSR DN}{CTRL
    9}{CTRL 2}S{COMD 6}{CTRL Ø}C
    RATCH A SEQ FILE        :REM*217
47Ø PRINTTAB(11)"{CRSR DN}{CTRL
    9}{CTRL 2}R{COMD 6}{CTRL Ø}E
    NAME A SEQ FILE         :REM*23
471 PRINTTAB(11)"{CRSR DN}{CTRL
    9}{CTRL 2}V{COMD 6}{CTRL Ø}A
    LIDATE A DISK           :REM*Ø
472 PRINTTAB(11)"{CRSR DN}{CTRL
    9}{CTRL 2}E{COMD 6}{CTRL Ø}X
    IT TO MAIN MENU{CTRL 8}
                            :REM*49
474 PRINT"{CRSR DN} {CTRL 9}{6 S
    PACEs}PRESS THE APPROPRIATE
```

→

```
    KEY{7 SPACEs}"          :REM*127
476 GOSUB3Ø:MR$=D$:DR$=D$:IFA$="
    $"ORA$="4"THENGOSUB422:GOTO4
    62                      :REM*199
478 IFA$="F"THEN4Ø2         :REM*67
48Ø IFA$="S"THENGOSUB498:GOTO488
                            :REM*159
482 IFA$="E"THEN68          :REM*233
483 IFA$="V"THENGOTO5ØØ     :REM*18Ø
484 IFA$="R"THENGOSUB498:GOTO493
                            :REM*17
486 GOSUB6Ø2:GOTO476        :REM*229
488 INPUT"{CRSR DN} {COMD 6}{CTR
    L 9}SCRATCH FILE NAME {CTRL
    8}{CTRL Ø}";DR$:IFDR$=D$THEN
    462                     :REM*95
49Ø OPEN15,8,15:OPEN5,8,5,"Ø:"+D
    R$+",S,R":GOSUB414:IFET=8THE
    N462                    :REM*241
492 CLOSE5:PRINT#15,"SØ:"+DR$:CL
    OSE15:GOTO462           :REM*167
493 INPUT"{CRSR DN} {COMD 6}{CTR
    L 9}RENAME OLD FILE {CTRL 8}
    {CTRL Ø}";DR$:IFDR$=D$THEN46
    2                       :REM*68
494 INPUT"{CRSR DN} {COMD 6}{CTR
    L 9}{4 SPACEs}TO NEW FILE {C
    TRL Ø}{CTRL 8}";MR$:IFMR$=D$
    THEN462                 :REM*9
495 OPEN15,8,15:OPEN5,8,5,"Ø:"+D
    R$+",S,R":GOSUB414:IFET=8THE
    N462                    :REM*246
496 CLOSE5:PRINT#15,"RØ:"+MR$+"=
    "+DR$:OPEN5,8,5:GOSUB414:IFE
    T=8THEN462              :REM*119
497 CLOSE5:CLOSE15:GOTO462
                            :REM*176
498 PRINT"{SHFT CLR}{COMD 6} ENT
    ER FILE NAMES EXACTLY AS SHO
    WN"                     :REM*1Ø5
499 PRINT" ON THE DIRECTORY, EX:
    {CTRL 8} DF] MAIL LIST{CRSR
    DN}{CTRL 8}":@"$Ø:*=S":RETUR
    N                       :REM*136
5ØØ PRINT"{SHFT CLR}":@"$":PRINT
    "{COMD 6}VALIDATE THIS DISK?
     {CTRL 9}{CTRL 2}Y{CTRL Ø}{C
    OMD 6}ES OR {CTRL 9}{CTRL 2}
    N{CTRL Ø}{COMD 6}O":GOSUB3Ø
                            :REM*225
5Ø2 IFA$<>"Y"THEN462        :REM*237
5Ø4 @"VØ":GOTO462           :REM*123
5Ø6 :                       :REM*227
6ØØ FORE=ØTO24:POKE54272+E,Ø:NEX
    T:POKE54296,15:RETURN:REM*46
6Ø2 POKE54277,58:POKE54278,16:PO
    KE54273,35:POKE54272,134
                            :REM*246
6Ø4 POKE54276,33:FORE=1TO1ØØ:NEX
    T:POKE54276,16:RETURN
                            :REM*11Ø
```

Listing 2. *SSort Program Generator.*

```
1Ø REM WRITTEN BY DAVID PETERSON
   (C)1986 MICHAELSOFT      :REM*216
2Ø PRINT"{SHFT CLR}{CTRL 2}SSORT
   PROGRAM GENERATOR"       :REM*92
3Ø PRINT"{CTRL 4}INSERT DISK & P
   RESS {CTRL 9}RETURN{CTRL Ø} W
   HEN READY"               :REM*196
4Ø GETA$:IFA$<>CHR$(13)THEN4Ø
                            :REM*44
5Ø OPEN2,8,2,"DP] SSORT,P,W":GOS
   UB15Ø                    :REM*114
6Ø PRINT#2,CHR$(7Ø)CHR$(2Ø1);
                            :REM*186
7Ø CK=Ø:FORI=1TO16Ø:READA:CK=CK+
   A:PRINT#2,CHR$(A);:NEXTI
                            :REM*132
8Ø CK=Ø:FORI=1TO16Ø:READA:CK=CK+
   A:PRINT#2,CHR$(A);:NEXTI
                            :REM*142
9Ø CK=Ø:FORI=1TO16Ø:READA:CK=CK+
   A:PRINT#2,CHR$(A);:NEXTI
                            :REM*152
1ØØ CK=Ø:FORI=1TO16Ø:READA:CK=CK
    +A:PRINT#2,CHR$(A);:NEXTI
                            :REM*162
11Ø CK=Ø:FORI=1TO57:READA:CK=CK+
   A:PRINT#2,CHR$(A);:NEXTI
                            :REM*148
13Ø CLOSE15:CLOSE2:PRINT TAB(9)"
   {COMD 7}DP] SSORT CREATED":P
   RINT:PRINT TAB(1Ø):END
                            :REM*222
14Ø CLOSE2:CLOSE15:OPEN15,8,15,"
   SØ:DP] SSORT":CLOSE15:END
                            :REM*84
15Ø CLOSE15:OPEN15,8,15:INPUT#15
   ,E,E$,T,S:IFE=ØTHENRETURN
                            :REM*2Ø6
16Ø PRINT"DISK ERROR"E": "E$;T;S
                            :REM*2ØØ
17Ø CLOSE15:OPEN15,8,15,"IØ:":CL
   OSE15:END                :REM*248
18Ø DATA 32,253,174,32,158,173,3
   2,247,183,165,2Ø,141,228,2Ø3
   ,165,21                  :REM*246
19Ø DATA 141,229,2Ø3,238,228,2Ø3
   ,173,228,2Ø3,2Ø8,3,238,229,2
   Ø3,141,226               :REM*26
2ØØ DATA 2Ø3,173,229,2Ø3,141,227
   ,2Ø3,16Ø,2,24,173,226,2Ø3,1Ø
```

→

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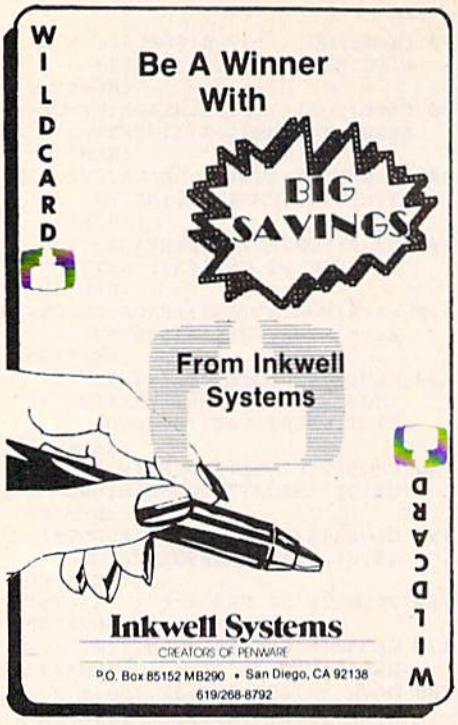

Listing 2 continued.

```
    9,228,203                 :REM*4
21Ø DATA 141,226,2Ø3,173,227,2Ø3
    ,1Ø9,229,2Ø3,141,227,2Ø3,136
    ,2Ø8,234                  :REM*162
22Ø DATA 32,253,174,32,158,173,3
    2,247,183,165,2Ø,141,228,2Ø3
    ,165,21                   :REM*3Ø
23Ø DATA 141,229,2Ø3,56,173,228,
    2Ø3,233,1,141,228,2Ø3,173,22
    9,2Ø3,233                 :REM*11Ø
24Ø DATA Ø,141,229,2Ø3,32,253,17
    4,32,158,173,32,247,183,165,
    2Ø,141,23Ø                :REM*64
25Ø DATA 2Ø3,165,21,141,231,2Ø3,
    162,Ø,232,142,24Ø,2Ø3,32,253
    ,174,32                   :REM*142
26Ø DATA 158,173,32,247,183,165,
    2Ø,174,24Ø,2Ø3,157,233,2Ø3,2
    24,6,2Ø8                  :REM*77
27Ø DATA 231,173,234,2Ø3,141,233
    ,2Ø3,169,1,141,232,2Ø3,32,25
    3,174,32                  :REM*119
28Ø DATA 158,173,165,71,141,248,
    2Ø3,141,25Ø,2Ø3,165,72,141,2
    49,2Ø3,141                :REM*1Ø1
29Ø DATA 251,2Ø3,16Ø,3,24,173,25
    Ø,2Ø3,1Ø9,228,2Ø3,141,25Ø,2Ø
    3,173,251                 :REM*123
3ØØ DATA 2Ø3,1Ø9,229,2Ø3,141,251
    ,2Ø3,136,2Ø8,234,173,248,2Ø3
    ,133,8Ø                   :REM*1Ø3
31Ø DATA 133,82,173,249,2Ø3,133,
    81,133,83,173,25Ø,2Ø3,133,78
    ,173,251                  :REM*1Ø5
32Ø DATA 2Ø3,133,79,173,228,2Ø3,
    141,252,2Ø3,173,229,2Ø3,141,
    253,2Ø3,24                :REM*61
33Ø DATA 11Ø,253,2Ø3,11Ø,252,2Ø3
    ,32,168,2Ø2,176,1,96,16Ø,3,2
    4,165,82                  :REM*93
34Ø DATA 1Ø9,252,2Ø3,133,82,165,
    83,1Ø9,253,2Ø3,133,83,136,2Ø
    8,238,169                 :REM*77
35Ø DATA Ø,141,254,2Ø3,32,192,2Ø
    2,32,181,2Ø2,32,214,2Ø2,176,
    8,32,24Ø                  :REM*245
36Ø DATA 2Ø2,169,1,141,254,2Ø3,3
    2,2Ø3,2Ø2,144,25,173,248,2Ø3
    ,133,8Ø                   :REM*55
37Ø DATA 133,82,173,249,2Ø3,133,
    81,133,83,173,254,2Ø3,24Ø,3,
    76,65,2Ø2                 :REM*89
38Ø DATA 76,52,2Ø2,24,165,8Ø,1Ø5
    ,3,133,8Ø,165,81,1Ø5,Ø,133,8
    1,24,165                  :REM*117
39Ø DATA 82,1Ø5,3,133,82,165,83,
    1Ø5,Ø,133,83,76,9Ø,2Ø2,173,2
    53,2Ø3,2Ø1                :REM*87
4ØØ DATA Ø,2Ø8,5,173,252,2Ø3,2Ø1
    ,1,96,16Ø,2,177,82,153,2,Ø,1
    36,16,248                 :REM*29
41Ø DATA 96,16Ø,2,177,8Ø,153,139
    ,Ø,136,16,248,96,165,83,197,
    79,2Ø8,4                  :REM*173
42Ø DATA 165,82,197,78,96,16Ø,25
    5,2ØØ,196,2,176,11,196,139,1
    76,6,177,3                :REM*195
43Ø DATA 2Ø9,14Ø,24Ø,241,96,196,
    139,176,1,96,76,135,2Ø3,32,9
    3,2Ø3,32                  :REM*69
44Ø DATA 53,2Ø3,174,23Ø,2Ø3,16Ø,
    2,177,82,153,245,2Ø3,177,8Ø,
    145,82,185                :REM*137
45Ø DATA 245,2Ø3,145,8Ø,136,16,2
    39,32,22,2Ø3,2Ø2,2Ø8,231,32,
    114,2Ø3,96                :REM*85
46Ø DATA 24,165,8Ø,1Ø9,226,2Ø3,1
    33,8Ø,165,81,1Ø9,227,2Ø3,133
    ,81,24,165                :REM*131
47Ø DATA 82,1Ø9,226,2Ø3,133,82,1
    65,83,1Ø9,227,2Ø3,133,83,96,
    172,233                   :REM*3
48Ø DATA 2Ø3,136,24Ø,33,56,165,8
    Ø,237,226,2Ø3,133,8Ø,165,81,
    237,227                   :REM*175
49Ø DATA 2Ø3,133,81,56,165,82,23
    7,226,2Ø3,133,82,165,83,237,
    227,2Ø3                   :REM*2Ø1
5ØØ DATA 133,83,136,2Ø8,223,96,1
    65,8Ø,141,241,2Ø3,165,81,141
    ,242,2Ø3                  :REM*67
51Ø DATA 165,82,141,243,2Ø3,165,
    83,141,244,2Ø3,96,173,241,2Ø
    3,133,8Ø                  :REM*7
52Ø DATA 173,242,2Ø3,133,81,173,
    243,2Ø3,133,82,173,244,2Ø3,1
    33,83,96                  :REM*2ØØ
53Ø DATA 238,232,2Ø3,172,232,2Ø3
    ,192,3,176,3,32,93,2Ø3,192,3
    ,144,2,1Ø4                :REM*4Ø
54Ø DATA 1Ø4,185,233,2Ø3,24Ø,34,
    32,53,2Ø3,172,232,2Ø3,185,23
    3,2Ø3,141                 :REM*152
55Ø DATA 233,2Ø3,32,2Ø1,2Ø3,32,1
    81,2Ø2,32,192,2Ø2,32,214,2Ø2
    ,176,8,32                 :REM*218
56Ø DATA 214,2Ø3,32,114,2Ø3,24,9
    6,32,214,2Ø3,32,114,2Ø3,56,9
    6,172,233                 :REM*16Ø
57Ø DATA 2Ø3,136,24Ø,6,32,22,2Ø3
    ,136,2Ø8,25Ø,96,16Ø,1,14Ø,23
    2,2Ø3,185                 :REM*96
58Ø DATA 233,2Ø3,141,233,2Ø3,96,
    Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,
    Ø,Ø,Ø,Ø,Ø                 :REM*146
59Ø DATA Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø
                              :REM*252
```

Listing 3. *DOS 5.1 Installer program.*

```
1Ø REM INSTALLS DOS 5.1 ON DATAF
   ILE 3.6 DISKS              :REM*2Ø
2Ø IFFL>ØTHEN7Ø               :REM*23Ø
3Ø PRINT"{COMD 6}{SHFT CLR} INSE
   RT 1541 DEMO DISK OR ANY DISK
    THAT                      :REM*17Ø
4Ø PRINT"{CRSR DN} CONTAINS {CTR
   L 9}{CTRL 8}DOS 5.1{COMD 6}{C
   TRL Ø} IN DISK DRIVE.":REM*76
5Ø PRINT"{CRSR DN} PRESS {CTRL 9
   }{CTRL 2}ANY KEY{CTRL Ø}{COMD
    6} WHEN READY             :REM*1Ø4
6Ø GOSUB15Ø                   :REM*86
7Ø IFFL=ØTHENFL=1:LOAD"DOS 5.1",
   8,1                        :REM*172
8Ø IFFL=1THENSYS52224          :REM*246
9Ø PRINT"{CRSR DN} INSERT DATAFI
   LE DISK IN DRIVE"          :REM*138
1ØØ PRINT"{CRSR DN} PRESS {CTRL
    2}{CTRL 9}ANY KEY{CTRL Ø}{CO
    MD 6} WHEN READY"         :REM*242
11Ø GOSUB15Ø                  :REM*136
12Ø POKE43,255:POKE44,2Ø3:POKE45
    ,9Ø:POKE46,2Ø7             :REM*244
13Ø SAVE"DP] DOS5.1",8,1:REM*112
14Ø POKE43,1:POKE44,8:POKE46,8:N
    EW                         :REM*24
15Ø GETA$:IFA$=""THEN15Ø      :REM*92
16Ø RETURN                    :REM*218
```

■

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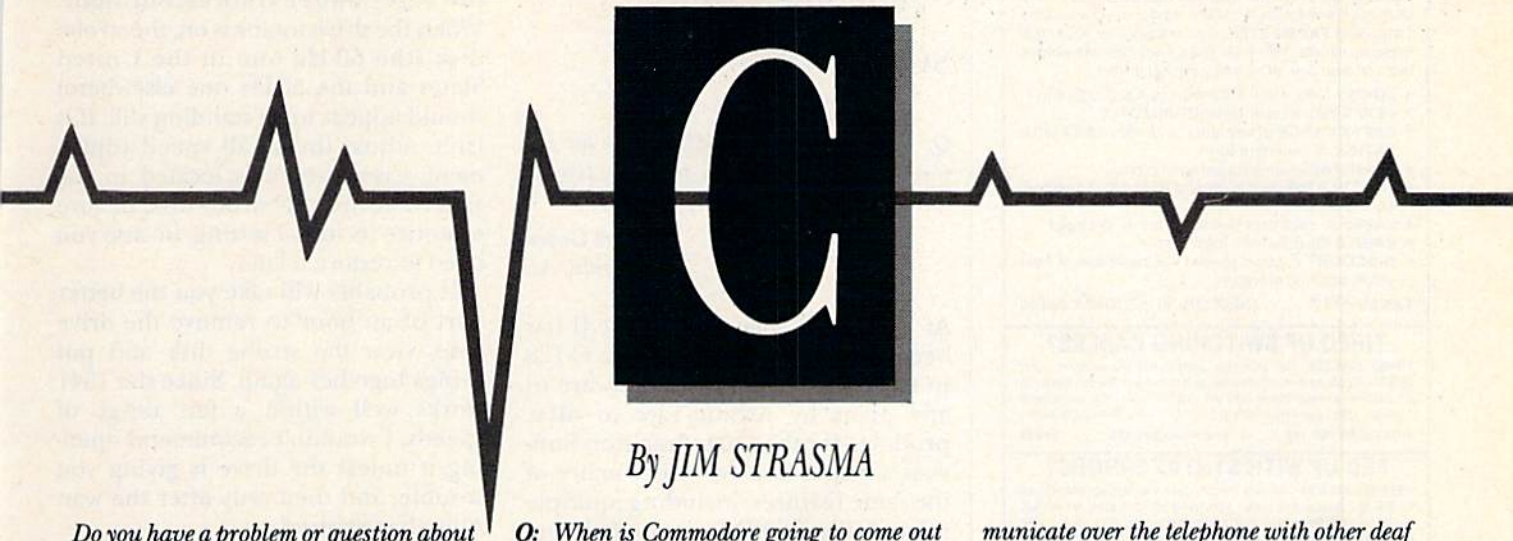

By JIM STRASMA

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Queries are answered only through this column, and, due to the volume of mail, only questions likely to appeal to the majority of our readers can be published.

HARDWARE

***Q:** Is it possible to connect a hard disk drive to the C-128? If so, where could I find one at a reasonable price?*

Jeff Miller
Midland, VA

A: Xetec (Salina, KS) has announced a 20-megabyte hard disk drive for the C-64 and C-128. It should be available as you read this for $895. According to a friend with a prototype, the drive plugs into the computer via Fiscal Information's Lt. Kernal cartridge, allowing it to run several times faster than if it were connected to the serial bus. Also, CSI (Melbourne, FL) is marketing a 10-megabyte hard disk drive for $995.

Hard disk drives are also slated from ICT (Frederick, MD; $895, 10-megabyte; $995, 20-megabyte), JCT (Grants Pass, OR; $895, 10-megabyte) and Progressive Peripherals and Software (Denver, CO; $899.95, 10-megabyte).

***Q:** When is Commodore going to come out with a lap-top computer? I heard they were working on one four years ago. Did they give up?*

Rowena Horr
Topeka, KS

A: I believe the answer is yes, although you can never be entirely sure about such things with Commodore. Two years ago the lap-top prototype was almost ready for production, but the bloom was already off the rose as far as lap-top sales were concerned. As good as the lap-top was, it wasn't completely compatible with the C-64. The financial woes that followed made release of the lap-top even less likely.

Many Commodore owners have had good luck using Tandy lap-tops as mobile accessories to the C-64 and C-128, connecting them via the built-in modem or RS-232 port. (See "Hook Up to a Portable" in this issue.)

***Q:** Where can I buy a one-slot expansion board—just an adapter—that will plug directly into the game port so that game cartridges can plug into it and not the port itself? If I can't buy one, how would I go about making one?*

Robert Desko
Endicott, NY

A: Value-Soft of Portland, Oregon, has advertised what you want in recent issues of *RUN*. The product is called 'LBow and sells for about $30.

***Q:** My husband is deaf, and we use a 45-baud teletype (a modified model 15) to communicate over the telephone with other deaf persons. We would like to set up one of our VICs as a TDD (Teletype Device for the Deaf). A $349 modem available from Krown Research of Los Angeles automatically recognizes an incoming call as either 45-baud Baudot code or 300-baud ASCII code and adjusts accordingly. It can connect to the VIC via an RS-232 port. Do you know of any way to achieve the same thing at a more affordable price?*

Janet Barker
Ogden, UT

A: I'm afraid it would be cheaper to buy a VIC and a VICModem for several friends than to buy one $349 modem plus the necessary RS-232 interface. I've seen VICs sell for as little as $30 each and VICModems offered free with subscriptions to telecommunications services. I suggest that you consider those as alternatives to a TDD.

Although I'm glad to learn of the Krown TDD, it seems to be time for all of us, deaf and otherwise, to use standard modems, both to take advantage of the lower prices allowed by mass production and to communicate with many more people than those who have TDDs.

***Q:** Where would I get a tractor feed for the Commodore 6400 printer?*

Gary Edwards
Coeur d'Alene, ID

A: The 6400 is nearly the same mechanically as a C. Itoh Starwriter, the F10-40, and uses the same tractor feed. Any C. Itoh dealer should be able to order one for you.

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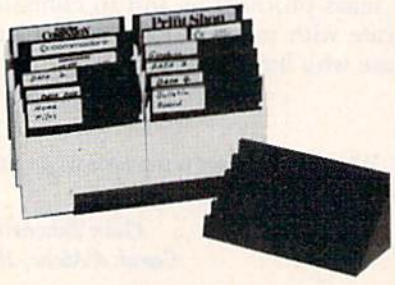

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Commodore Clinic

SOFTWARE

Q: Does Ashton-Tate make dBase for the C-64? If not, is there a program like or better than dBase II or III for the C-64?

Robert Goyer
Huntsville, AL

A: The CP/M version of dBase II has been used successfully on the C-128 in CP/M mode, but I'm not aware of any plans by Ashton-Tate to offer products for the C-64. Precision Software's Superbase 64 offers many of the same features, including multiple related files and a command language. This program has been popular with Commodore owners for several years.

Q: The local chapter of The Lupus Foundation keeps membership records using Superbase on the C-64. As our membership rolls grow, we are running out of disk storage space. We could split the file, but there are times when we want to sort it in its entirety. Ideally, we would like to expand our storage space through a change or addition in software or hardware. Are there any solutions?

William T. Blake
Louisville, KY

A: You might be an ideal candidate for one of the hard disk drives mentioned above. My friend with the Xetec prototype has used it with Superbase, and 20 megabytes of storage should be adequate for all your needs. Be sure to test Superbase on the hard disk drives before buying.

REPAIRS

Q: My 1541 disk drive is slower than the specified speed of the drive. Can I repair my drive so it will spin at the regular speed?

Ryan Wong
Alhambra, CA

A: First, how did you discover that the drive speed is incorrect? At least one well-known speed-measuring program was itself incorrect when it was first released. The best way to be sure of the drive speed is by looking at the strobe disk (on the bottom of the drive inside the case) under fluorescent light. When the drive motor is on, the strobe disk (the 60-Hz one in the United States and the 50-Hz one elsewhere) should appear to be standing still. If it isn't, adjust the small speed-adjustment screw, which is located in the small hole near the strobe disk. Be sure to notice its initial setting, in case you need to restore it later.

It probably will take you the better part of an hour to remove the drive case, view the strobe disk and put things together again. Since the 1541 works well within a fair range of speeds, I wouldn't recommend opening it unless the drive is giving you trouble, and then only after the warranty has expired.

Q: I have a C-128 and a 1571 disk drive. When I format one side of a disk, everything works fine, but when I format the flip side, the first side doesn't work. What's wrong? I've changed 1571s twice, but I still have the same problem.

Rene Del Valle
Queens, NY

A: The "problem" is that the 1571 is already a double-sided drive and automatically formats both sides of the disk at the same time. The popular trick of cutting an extra hole in a disk to format its flip side is unnecessary on a 1571. Each time you flip the disk and reformat, you're destroying what you've already done on the first side.

Q: My 1541 drive won't auto-initialize. I've had it repaired three times for assorted problems, but the only trouble now seems to be the initializing. I can load a directory when the drive is first turned on, but if I replace it and try to load a directory, I get a File Not Found message. I've learned to work around the problem, but it's annoying to have to initialize each time. Do you have any suggestions?

Paul Whomsley
Prospect Park, PA

A: One common cause of your problem is dust or other debris covering the 1541's light sensor, used to recognize the insertion of a new disk. This makes it impossible to save any new programs or files to your disks, or even to format a new disk.

Try formatting a disk. If you can't, clean the sensor, located inside the

drive at the spot normally occupied by the write-protect notch on a disk. If that doesn't solve the problem, check to be sure the wires from the sensor are plugged in properly. If they are, the sensor itself or the 6526 I/O chip that controls it might be defective. These also are the prime suspects if you can still format disks and save programs.

PROGRAMMING

Q: How do I put more than one program on a disk? For instance, sometimes I type a program from RUN *one month and want to save another program on the same disk the next month. How can I do this without erasing the first program?*

S. Galatowitsch
Saint Paul, MN

A: Unlike cassettes, which can easily erase an existing program when you save a new one on the same cassette, disks make it both easy to save a second program on the same disk and difficult to erase earlier programs without intending to.

Starting from a blank, formatted disk, you can save your first program with the command:

```
SAVE "0:NAMEONE",8
```

When you type in another program, save it with the command:

```
SAVE "0:NAMETWO",8
```

The only thing that changes is the program name, which must be different for each program on a disk. Even if you forget and attempt to reuse a name, the error light on the disk drive will begin flashing to tell you to try a different name.

Q: I'm considering purchasing another 1571 disk drive, but I can't find any information on how to use two disk drives with copy-protected software. I don't want to buy another 1571 and then discover that I can't use the second drive because the device number within the program can't be changed.

Cheryl Mansfield-Egans
Kingwood, TX

A: As you might already know, changing the device number of a 1571 drive is simply a matter of flipping a small switch on the back of the drive. C-128 Basic programs that can be modified are easy to adapt for use with added drives. For example, you can add the phrase ON U(9) to the end of disk commands intended for disk unit 9.

Copy-protected programs present a special challenge. Instead of trying to adapt these yourself, simply limit your purchases to programs that explicitly support multiple disk units. Such programs are becoming more and more common as Commodore owners expand their systems. Fortunately, CP/M programs, the ones most likely to require two disk drives, also are the least likely to be copy protected.

UPDATE

Update: A few months ago in Telecomputing Workshop (September 1986, p. 90), David Bradley noted that he had not found anything to protect modems from voltage surges on the phone line. The Philips EMF-232 protects your modem, while the EMF-315 protects the power line. Both are available from any Philips ECG distributor.

A. Hughes
Williamsport, PA

A: I installed the EMF-232 phone line surge suppressor and EMF-315 power line noise and surge suppressor by inserting them into a properly grounded outlet and connecting them to my computer system.

The EMF-315 has three particularly useful features: a monitor light to show it's working properly, a fuse to make sure power is cut off if the unit is damaged by a power surge, and a noise-reduction circuit to protect your computer from interference on the power line and avoid adding to it.

Now that suitable protectors are available for both computers and modems, using either without protection means taking a small, continuous and unnecessary risk.

RUN *associate editor Jim Strasma teaches computer science at Western Illinois University and is a United Methodist minister. He has authored a half-dozen books and nearly a hundred articles about Commodore and IBM-PC computers.* ■

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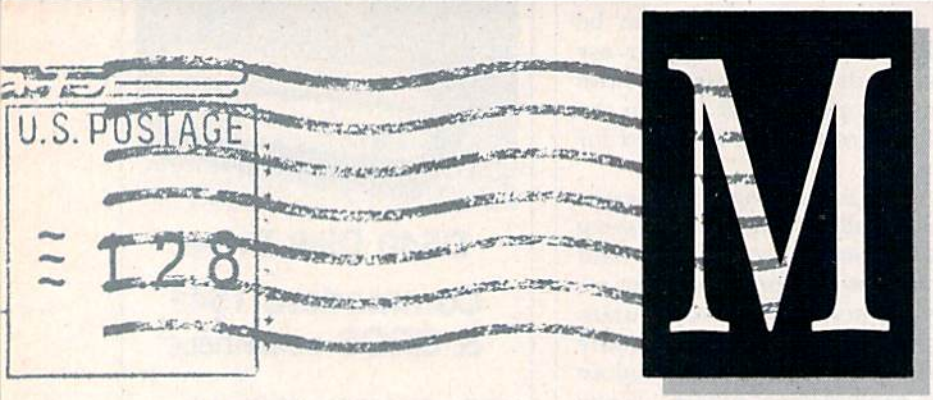

DFCalc Listing

Being of thrifty Pennsylvania Dutch heritage, I've spent long hours typing in and debugging Mike Konshak's excellent Datafile series. Now I find that I must purchase Productivity Pak II just to get the DFCalc segment, and I'm angry about it.

For *RUN* to sweeten the pot with unpublished programs is a nice gesture, as well as good salesmanship. But when that extra goodie is part of a published series, I feel victimized. Please, for those of us with the ambition to manually enter this series, publish DFCalc.

Thomas C. Snyder
Martins Creek, PA

Yours was one of many letters we've received from disappointed readers looking for the DFCalc program. We've heard you and will publish DFCalc in the April 1987 issue. Thanks for your suggestion and your patience, and we hope you enjoy the program.

Editors

Giving Up on the 128?

I strongly agree with Albert Coya, of Miami, FL, whose letter about the problems we C-128 owners are having with software availability appeared in last November's Mail RUN. I bought my C-128 in December 1985 after hearing all the hype about the new "super Commodore computer" and all its features. But new programs? Only occasionally, because Commodore isn't supporting the C-128 and the Commodore-specific magazines are devoted almost exclusively to the C-64. I'm on the verge of selling my equipment, cancelling my subscriptions to Commodore magazines and on-line services and going to Radio Shack, with its IBM compatibility and manufacturer's support.

Gene Ford
Buda, TX

I agree fully with Albert Coya in last November's Mail RUN. The C-64 was a great success, but it was four years before Commodore came through with adequate support and software. Now I've upgraded to a C-128, and I'm *not* waiting another four years for the software to catch up to the machine. I'm giving Commodore to the end of 1987 to improve its support for the 128, and if it doesn't, I'll be looking for a brand of computer that *does* have software support.

J. W. Pfeifer
Everman, TX

Disk-Based Index

I'd like to suggest that *RUN* publish a disk that lists, in alphabetical order, all your articles since your first issue. This list should include the full name of the article, the month and year it was published and a brief description of its content. Several other magazines publish such a list on an annual basis, but I'd like to see the concept go one step further with an index on disk.

Russ Warnky
Old Fort, NC

RUN *also publishes an annual index to its articles and reviews in the magazine. The index for 1986 appeared in last month's issue. In addition, we are starting to put the annual index on disk. All of our 1986 articles and reviews are listed on the January/February 1987 ReRUN disk. You'll find an order form for ReRUN disks in this magazine on page 48.*

Editors

Timeworks/Seikosha Compatibility

Last August I wrote to *RUN* because I couldn't get my Seikosha SP-1000VC printer to work with Timeworks. You said the problem must be in either the software or the printer, so I contacted Timeworks. They kindly gave me the phone number of Seikosha's U.S. representative.

The Seikosha people were aware of the problem and sent me an updated ROM chip with full instructions for installation, as well as access codes for all of Seikosha's many built-in fea-

tures. I was able to make the conversion easily and quickly.

Seikosha's U.S. toll-free phone number is 800-422-7768, in case anyone else is having the same problem. They assured me any assistance I might need in the future was only a phone call away.

Charles A. Stablein
Bozeman, MT

Star Demo Listings

I read with great interest Tim Walsh's article "The Gemini II and NL-10 Printers" in the November 1986 issue of *RUN*. It was an excellent article, but being a novice at using a printer, I need some help.

My equipment includes a C-64, a 1541 disk drive, a Star Micronics NX-10 (not NX-10C) printer and a Xetec Super Graphix interface for the C-64. The following program appears in the NX-10 manual:

```
10 'Demo of pica and elite pitches
20 LPRINT CHR$(27);"M";
30 LPRINT "This line is ELITE pitch."
40 LPRINT CHR$(27);"P";
50 LPRINT "This line is PICA pitch
   (normal)."
```

As written, this program doesn't work with my C-64, and I don't know how to convert it to work. The NX-10 manual includes numerous other programs for demonstrating the capabilities of the printer, and it's the same story with all of them.

I've written twice to Star Micronics National Support Services, but they have ignored my letters. Could you please help? I have no problem using the printer with other programs, such as word processors.

Maurice F. Hamblett
Venice, FL

To convert the listings in the Star Micronics manual from IBM format to Commodore format, open the printer channel and substitute LPRINT with PRINT#<channel number> to direct output to the printer. The program you included in your letter could be converted in a number of ways. Here's an example;

```
10 REM DEMO OF PICA AND ELITE
   PITCHES
20 OPEN 4,4: PRINT#4, CHR$(27); CHR$(M);:
   REM SUBSTITUTE THE PROPER CHR$
   (ASCII CODE) FOR "M"
30 PRINT#4,"THIS LINE IS ELITE"
40 PRINT#4, CHR$(27), CHR$(P);: REM SUB
   STITUTE THE PROPER CHR$ (ASCII
   CODE) FOR "P"
50 PRINT#4,"THIS LINE IS PICA"
60 CLOSE4
```

In these examples, some Star Micronics printers will use CHR$(1) and CHR$(2), respectively, for pica and elite.

Editors

Correction

Thank you for reviewing our MASH program in December's Software Gallery (p. 29). However, I am concerned that the wrong company was credited as a supplier of the program. The authorized dealer for this program is Chipmunk Software, PO Box 463, Battle Ground, WA 98604, telephone 800-331-3428.

Tom Croley
MASH Author
Owner, Chipmunk Software

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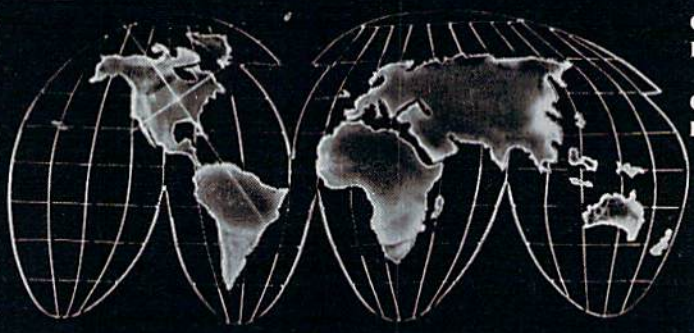

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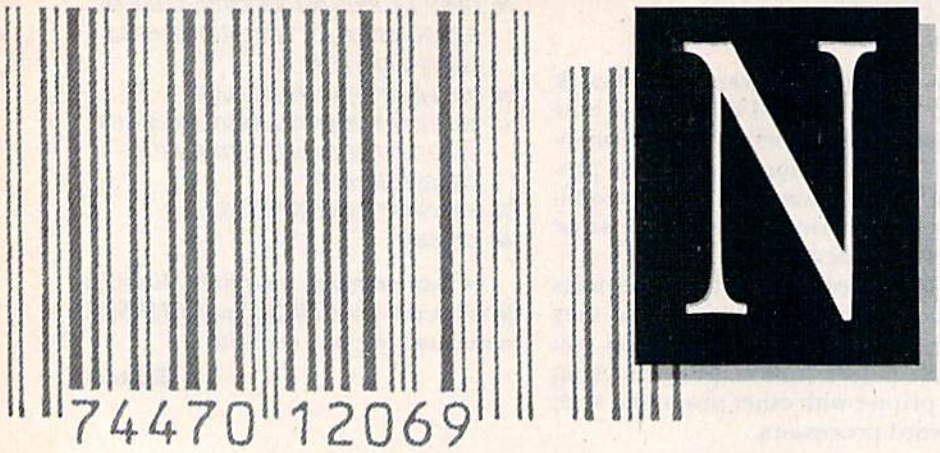

Compiled by HAROLD R. BJORNSEN

The Picture of Dorian Gray

The Videoprint, a unit that attaches to your computer, printer, video camera, TV or VCR to create video printouts, has been released by Cyberworks (6 Kitchener St., Unit #7, Orillia, Ontario, Canada L3V 6Z9). It not only produces 14-inch prints for home-entertainment and business applications, but also for terrorism control, physical therapy, graphic arts and industrial institutional markets as well. With one version of Videoprint, reporters can instantly relay photographs of events around the world to their head office over the telephone, and videophiles can make prints of scenes from music videos, movies, parties, even Dorian Gray. Although a computer isn't required to use Videoprint, you do need a dot-matrix printer. The Videoprint is available for $399.

Check Reader Service number 400.

Educating Rita

Commodore Business Machines (1200 Wilson Drive, West Chester, PA 19380) has announced that it will provide a free MECC (Minnesota Educational Computing Corporation) educational program (a $20 value) with the purchase of a Commodore 64C computer. Up to now, MECC software has been available almost exclusively to schools. The programs cover a range of subjects, including elementary and advanced math, ecology/biology, spelling, decision making, economics, and computer use and technology. One program selected from the series is included with each 64C.

The Shop on Main Street

Kledzik (25605 Cielo Court, Valencia, CA 91355) has released Shopping List, a menu-driven list-generator program for the C-64. To create and print out a shopping list organized by aisle, you "walk" through 21 different "aisles," selecting the names and quantities of items you need to buy. Shopping List comprises over 800 of the most popular grocery items divided into 19 different aisles: bakery, baking needs, beverages, cereals, cleaners/detergents, condiments, dairy, packaged entrees, fruits, health/beauty aids, jellies/toppings, meat/fish, miscellaneous, oils/dressings, paper products, pasta/rice, snack foods, soups and vegetables. Also included are two special aisles so you can enter your own items: Main Course is for up to 200 of your favorite main course dishes; Extra is for items not found in the other 19 aisles. Shopping List is available on disk for $29.95.

Check Reader Service number 401.

Take the Money and Run

Great American Software (PO Box 910, Amherst, NH 03031) has released Dome Accounting by Computer, a $39.95 disk-based software package for the C-64 that is closely modeled after the popular Dome Simplified Bookkeeping Records. Features include easy set-up procedures (including a complete chart of accounts that you can modify to reflect your actual bookkeeping categories), automatic updating, disk accessories (including a calculator, perpetual calendar and a built-in memo pad) and reports (which provide a list of expense, income and payroll items entered).

Check Reader Service number 402.

Labyrinth

"Welcome to the world of the Labyrinth. You should have no problems in this little kingdom: a few riddles, a few mazes, plenty of goblins. You're sure to find your way out in time, but if you don't, you will become the sole property of The Goblin King. Forever." Thus begins Labyrinth: The Computer Game, an animated graphic adventure based on the fantasy film, Labyrinth. Along the way, through a twisting, winding maze of paths and passageways, you'll meet many amazing characters. Some will offer their assistance, while others will do everything in their power to keep you trapped inside the Labyrinth. Labyrinth: The Computer Game is available on disk for the C-64 for $34.95. Activision, 2350 Bayshore Parkway, Mountain View, CA 94043.

Check Reader Service number 403.

The Color of Money

Wallstreet Microscope, a stock analyzer and database for the C-64 (Wallstreet Corp., 1527 South 93rd Ave., Omaha, NE 68124), lets you use ten criteria to identify and avoid over-

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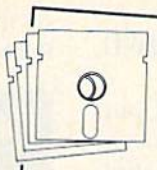

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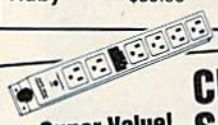

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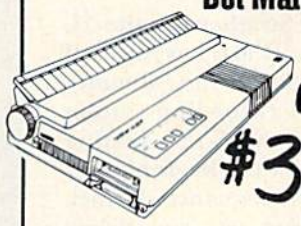

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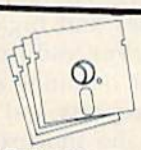

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valued stocks and identify and purchase under-valued stocks. A database of historical and current information of 1500 companies is included on disk. Wallstreet Microscope is available for $135; the database is updated quarterly ($100) and monthly ($300), providing information from the previous 12 months.

Check Reader Service number 404.

The Sound of Music

Sonus (21430 Strathern, Suite H, Canoga Park, CA 91304) has released the Super Sequencer 128, a multifunctional MIDI recording system and librarian for the C-128. Editing features let you set the beginning or end of each music sequence. A track modification menu lets you delete pitch wheel, mod wheel, sustain pedal or volume change. You can arrange sequences into a song with a combination of editing functions, including transposition of an entire song or just a section. Other features include: 16 sequences/8 tracks, meter adjustment, nondestructive bounce, step record and play, velocity editing, auto-correct, programmable cue points and sequence appending. The Super Sequencer utilizes all of the major Commodore MIDI interfaces and is available for $275.95.

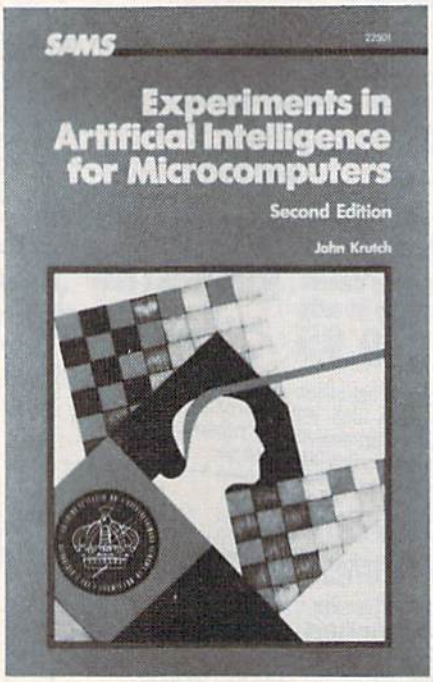
Check Reader Service number 405.

Expand Your Library

Howard W. Sams (4300 W. 62nd St., Indianapolis, IN 46268) has published two books for Commodore computers.

Commodore 128 Assembly Language Programming is a 300-page guide that explores such topics as Mapping the C-128; 40- and 80-Column Text, Text Graphics and High-Resolution Graphics; C-128 Music and Sound; and C-128 File Management and the 1571 Disk Drive. $15.95.

Experiments in Artificial Intelligence for Microcomputers, a 176-page instructional text for the C-64 and C-128, contains 75 percent more material than previous editions, with many new chapters. Topics covered include: Artificial Intelligence and Basic, Problem Solving, Programs that Reason, Computer Analysis of Arguments, Expert Systems and Blue Sky Projects. $14.95.



Check Reader Service number 406.

Text Database Manager

KnowledgeWare (2013 NE 55th Blvd., Gainesville, FL 32601) has released Multifinder, a text database manager for the C-64 with the 1541 or 1571 disk drive. A full-screen editor simplifies data entry and searching involves only entering the search words and beginning the search. Five applications are included: literature references, names and addresses, recipes, video tapes and a software catalog. You can design your own application, too. Multifinder is available for $39.95. A demo is available for $2.

Check Reader Service number 407.

Play the Numbers Game

Tensoft (PO Box 86971, San Diego, CA 92138) introduces Arithmetician, a game of arithmetic practice for students. It features full-color, animated graphics and continuous music, to encourage players to improve their speed and accuracy. The program covers a range of arithmetic skills, from single-digit addition to seven-digit long division, and the highest scores for a session are saved on the Player Hall of Fame. Arithmetician is available on disk for the C-64 for $24.95.

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The Paper Chase

You've always dreamed of running the student newspaper, spending a semester in Paris and being outnumbered 1000 to 1 by the opposite sex. That's no problem with The Perfect College, a database on over 1650 accredited four-year U.S. colleges and universities. Choose up to 26 college-selection criteria, including cost, location, majors, overall competitiveness, student/faculty ratio, and, of course, the male/female ratio. The program then produces a list of the schools that match your needs.

The database includes over 440,000 facts to help you identify the schools best-suited to you, and annual updates ensure that information is current. The Perfect College is available on disk for the C-64 for $19.95. Mindscape, Inc., 3444 Dundee Road, Northbrook, IL 60062.

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Get Your Thoughts Together

Keep confusion and inaneness at bay with Thinking Cap, an outline processor and thought organizer from Broderbund Software (17 Paul Drive, San Rafael, CA 94903). Thinking Cap automatically formats and organizes your thoughts and ideas, and you can use the program for outlining everything from school reports and term papers to speeches and short stories. Special features include outline templates, full-featured editing, automatic creation of outline format and a choice of Roman, Arabic and scientific numbering of outlines. Available on disk for the C-64 for $49.95.

Check Reader Service number 410.

This is Only a Test

Test Generator (Gamco, PO Box 1911, Big Spring, TX 79721), a disk-based program that generates student tests, allows teachers to enter up to 500 questions of various types (fill in the blank, matching, multiple choice, true/false and short answer/essay) and

then to design tests composed of those questions. A test can contain one type of question or a mixture of types. Individual questions as well as tests are stored for future use. Questions and tests may be reviewed, edited, deleted and printed out. Test Generator is available for the C-64 for $49.95, and a backup disk is available for an additional $15.

Check Reader Service number 411.

Country

Dynacomp (1064 Gravel Road, Webster, NY 14580) has added three new, educational software packages to its catalog. Each package contains two disks and a manual for the C-64 and retails for $129.95 each.

U.S.A. Profile is a social and geographical database containing qualitative and statistical information on each of the U.S. states and the District of Columbia. Activities included in the classroom materials lead students to use data to form and test hypotheses about trends and patterns.

One World: Countries Database is a reference file containing 33 categories of information on each of the 178 independent nations of the world. The categories include demographic, political, geographical and economic data, and, because data changes frequently, some categories can be edited.

Hometown Demographics lets you conduct surveys of your hometown, a common aspect of local history projects. You can store 12 pieces of data, including age, gender, marital status, ethnic origin, employment and residence. Nine blank categories let you save data for additional items designed by the students.

Check Reader Service number 413.

IBM Printer Interface

Omnitronix (760 Harrison St., Seattle, WA 98109) has released the CBM/IBM interface cable and driver to allow Commodore-type printers to be used with the IBM PC and compatibles. It connects to any standard IBM-compatible parallel printer port, and the five-foot cable connects to the Commodore-type printer. The CBM/IBM Printer Interface is available for $34.95.

Check Reader Service number 412.

That Championship Season

Springboard Software (7808 Creekridge Circle, Minneapolis, MN 55435) has created Clip Art Collection, Volume 3, a collection of sports and recreation illustrations for use with its program, The Newsroom. The program features more than 600 illustrations in dozens of categories, such as football, basketball, tennis, skiing, camping, golf, volleyball, hunting, fishing and aerobics. The artwork can be used as drawn, modified with The Newsroom's editing tools, or combined with clip art from any other program in The Newsroom family. Available on disk for the C-64 for $29.95.

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Remember the fun of tuning in all those foreign broadcast stations on the short-wave radio? Remember those mysterious sounding coded tone signals that baffled you? Well, most of those beeps & squeals are really digital data transmissions using radioteletype or Morse code. The signals are coming in from weather stations, news services, ships & ham radio operators all over the world. Our short-wave listener cartridge, the "SWL", will bring that data from your radio right to the video screen. You'll see the actual text as it's being sent from those far away transmitters.

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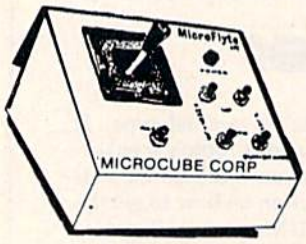

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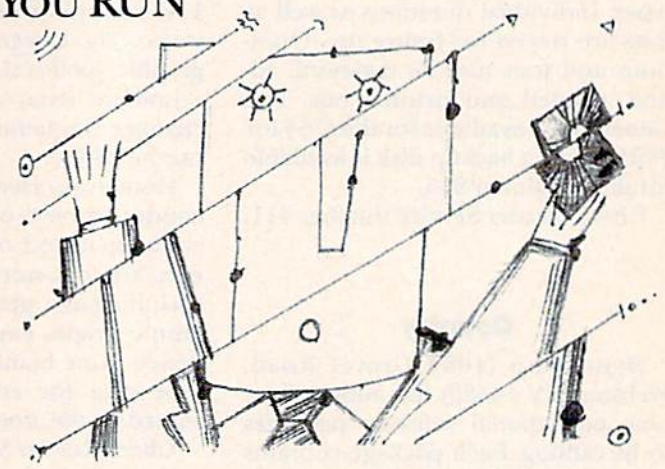

We receive many letters from new Commodore owners who want to learn the first steps in using their computers. For these first-time users, we present the following step-by-step list of things that all beginners should be aware of as they start typing in programs.

1. Before you can use a fresh disk, you have to format it. First turn on your disk drive, then insert the disk, close the latch and type:

```
OPEN15,8,15 <Press Return>
PRINT#15,"N0:NAME,##" <Press Return>
```

The ## is a two-character identification number that can be any combination of letters and/or digits. "NAME" can be any title for your disk that you choose, but it must not exceed 16 characters. Wait for a few minutes while the disk spins inside the drive, being formatted. When the disk stops spinning, type:

```
CLOSE15 <Press Return>
```

C-128 owners can shorten this procedure by simply typing:

```
HEADER "NAME,##" <Press Return>
```

Caution: The formatting process erases all material already on the disk, so if you're formatting a used disk, make sure it doesn't contain any programs you want to save. See item 7, below, on reading the disk directory.

2. As a beginner, you should start entering short Basic programs. Avoid machine language listings and very lengthy Basic programs until you get the hang of what you're doing. We have a checksum program (Perfect Typist) which actually proofreads your typing and tells you when you make a mistake. You should type in Perfect Typist before you enter any programs. See directions below.

3. Remember to press the return key after each programming line you type in.

4. As you are typing in a program, you are likely to make typographical errors. To check what you have typed in, you'll need to list your program's lines on the screen. You can specify the exact lines that you want to see. Typing LIST 10–50 will list lines 10 through 50. LIST 20 will list only line 20. If you see an error in one of your

listed lines, you can fix it by using the INST/DEL key and retyping the incorrect section of the line. Always press the return key after you have fixed a line.

5. Be sure to save what you have typed in before turning off your computer. To save any partial or complete Basic program listing to your disk, type:

SAVE "NAME",8 <Press Return>

C-128 owners can press F5, type in the program name, and press the return key.

Note: As you save subsequent versions of the same program, you need to make a slight change in the program name each time. You might simply add version numbers to the end of the program name (PROGRAM.1, PROGRAM.2, etc.).

6. While working on a program, you may develop several versions before you're satisfied that you have it in final form. After you *do* achieve that final version, you might want to go back and erase the old, incomplete versions from your disk. Erasing unwanted programs is called scratching. (Be sure not to erase your final version!) To scratch a program, type:

OPEN15,8,15 <Press Return>
PRINT#15,"S0:prog.name" <Press Return and wait a few seconds>
CLOSE15 <Press Return>

7. After you have saved several programs to your disk, you will need to see their names so that you can load the one you want. To get the complete list (the disk directory) of all the program names on your disk, type:

LOAD "$",8 <Press Return>

Then type LIST to actually see the directory. C-128 owners simply press F3.

8. When you know what program you want to load into your computer, type:

LOAD "NAME",8 <Press Return>

C-128 owners can just press F2, type in the program name, and press the return key.

9. After you have loaded a program, type RUN to actually use the program.

How to Type Listings From *RUN*

To simplify your typing of *RUN*'s C-64 and C-128 program listings, we include checksum numbers. These numbers follow a REM statement at the end of each line (e.g., :REM*123). These checksum numbers necessitate your using *RUN*'s Perfect Typist programs, listed below. Use 64 Perfect Typist for C-64 programs and 128 Perfect Typist for 128 Mode programs on the C-128.

Type in 64 Perfect Typist (Listing 1) or 128 Perfect Typist (Listing 2) and save it to either tape or disk before running. When you want to type in a 64- or a 128-mode program, first load and run the appropriate Perfect Typist listing. Two SYS numbers will be displayed on your screen. Jot these down and keep them handy. They are

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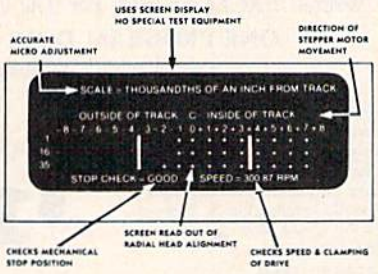

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the SYS numbers that you type in for deactivating and reactivating the checksum program.

After Perfect Typist has been loaded and run, start typing in the program listing from *RUN* as you normally do. The only difference is that now, after you press the return key to log in each line, a 1-, 2- or 3-digit number will appear below the line on the left margin. This is the checksum number, ranging from 0 to 255.

If this number matches the checksum number printed in the listing after the :REM*, then you know you have typed that line correctly. Then you type the next program line right over the previous line's checksum value. If the checksum numbers do not agree, analyze your line on screen for any typographic errors or omissions. Make the needed changes and press the return key again to log in those changes. A new checksum number will appear in place of the old one. Compare this to the magazine's number and then proceed to the next line.

When you've finished typing in your program, disable the Perfect Typist by typing in the appropriate SYS number for either 64 or 128 mode, and press the return key. Now you can save your program as usual, to disk or tape. (Before you attempt to run your new program, turn your computer off and back on to completely clear out the Perfect Typist program.)

You may save an incomplete program any time and continue it later. You will have to reload and run the Perfect Typist program, then load the incompleted program that you were working on, list it, and continue where you left off.

The 128 Perfect Typist will work in either 40 or 80 columns. Also, it lets you use the C-128's automatic line-numbering. If Auto is on, the checksum will be printed below the line you just entered, and the C-128 will place the next line number below the checksum.

All listings in *RUN* have been translated so that the graphics and control characters are designated as understandable key combinations. When you see instructions inside curly brackets, such as {SHIFT L}, you should hold down the shift key and press the L key. What you see on your screen will look quite different from what is designated inside the brackets. Another example is {22 SPACEs}, which instructs you to press the space bar 22 times.

Listing 1. *64 Perfect Typist program.*

```
1 REM 64 PERFECT TYPIST
2 REM BY: JAMES E BORDEN
1Ø POKE56,PEEK(56)-1:POKE52,PEEK(56):CLR
2Ø PG=PEEK(56):ML=PG*256+6Ø
3Ø FORX=ML TO ML+154:READD:T=T+D:POKEX,D:NE
   XT
4Ø IFT<>16251 THEN PRINT"ERROR IN DATA...":
   END
6Ø POKEML+4,PG:POKE ML+1Ø,PG:POKE ML+16,PG
7Ø POKE ML+2Ø,PG:POKE ML+32,PG:POKE ML+38,P
   G
8Ø POKE ML+141,PG
89 PRINT"{SHFT CLR}{CRSR RT}**************
   **********************"
9Ø SYS ML:PRINT "{CRSR RT}** 64 PERFECT TYP
   IST IS NOW ACTIVE{2 SPACEs}**"
```


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```
1ØØ PRINT "{CRSR RT}** SYS"ML"=ON{5 SPACEs}
    SYS"ML+3Ø"=OFF **"
1Ø1 PRINT"{CRSR RT}**********************
    **************":NEW
11Ø DATA 173,ØØ5,ØØ3,2Ø1,ØØ3,2Ø8,ØØ1,Ø96
12Ø DATA 141,1Ø5,ØØ3,173,ØØ4,ØØ3,141,1Ø4
13Ø DATA ØØ3,162,1Ø3,16Ø,ØØ3,142,ØØ4,ØØ3
14Ø DATA 14Ø,ØØ5,ØØ3,Ø96,234,234,173,1Ø4
15Ø DATA ØØ3,141,ØØ4,ØØ3,173,1Ø5,ØØ3,141
16Ø DATA ØØ5,ØØ3,Ø96,Ø32,124,165,132,Ø11
17Ø DATA 162,ØØØ,142,24Ø,ØØ3,142,241,ØØ3
18Ø DATA 189,ØØØ,ØØ2,24Ø,Ø51,2Ø1,Ø32,2Ø8
19Ø DATA ØØ4,164,212,24Ø,Ø4Ø,2Ø1,Ø34,2Ø8
2ØØ DATA ØØ8,Ø72,165,212,Ø73,ØØ1,133,212
21Ø DATA 1Ø4,Ø72,238,241,ØØ3,173,241,ØØ3
22Ø DATA Ø41,ØØ7,168,1Ø4,Ø24,Ø72,Ø24,1Ø4
23Ø DATA Ø16,ØØ1,Ø56,Ø42,136,Ø16,246,1Ø9
24Ø DATA 24Ø,ØØ3,141,24Ø,ØØ3,232,2Ø8,2ØØ
25Ø DATA 173,24Ø,ØØ3,Ø24,1Ø1,Ø2Ø,Ø24,1Ø1
26Ø DATA Ø21,141,24Ø,ØØ3,169,Ø42,Ø32,21Ø
27Ø DATA 255,169,ØØØ,174,24Ø,ØØ3,Ø32,2Ø5
28Ø DATA 189,162,ØØ3,189,211,ØØ3,Ø32,21Ø
29Ø DATA 255,2Ø2,Ø16,247,164,Ø11,Ø96,145
3ØØ DATA Ø13,Ø32,Ø32
```

Listing 2. *128 Perfect Typist program.*

```
1 REM 4Ø/8Ø COL C128 PERFECT TYPIST
2 REM BY: JAMES E BORDEN
1Ø FORX=512ØTO5379:READD:T=T+D:POKEX,D
2Ø NEXT:IFT<>28312 THENPRINT"{2 CRSR DNs}ER
   ROR IN DATA...":END
25 A$="":IFPEEK(215) THENA$="{2Ø SPACEs}"
3Ø PRINT"{SHFT CLR}"A$" ******************
   ******************"
4Ø PRINTA$" ** 128 PERFECT TYPIST IS NOW AC
   TIVE **"
5Ø PRINTA$" **{2 SPACEs}SYS 512Ø=ON{7 SPACE
   s}SYS 515Ø=OFF{2 SPACEs}**"
6Ø PRINTA$" ******************************
   *******":SYS512Ø:NEW
7Ø DATA 173,5,3,2Ø1,2Ø,2Ø8,1,96,141,45,2Ø,1
   73,4,3,141,44,2Ø,162,43,16Ø,2Ø
8Ø DATA 142,4,3,14Ø,5,3,96,234,234,173,44,2
   Ø,141,4,3,173,45,2Ø,141,5,3,96
9Ø DATA 32,13,67,14Ø,255,19,162,Ø,142,252,1
   9,142,253,19,142,254,19,189,Ø,2
1ØØ DATA 2Ø1,32,24Ø,8,2Ø1,48,144,7,2Ø1,58,1
   76,3,232,2Ø8,238,189,Ø,2,24Ø,54
11Ø DATA 2Ø1,32,2Ø8,5,172,254,19,24Ø,42,2Ø1
   ,34,2Ø8,1Ø,72,173,254,19,73,1
12Ø DATA 141,254,19,1Ø4,72,238,253,19,173,2
   53,19,41,7,168,1Ø4,24,72,24,1Ø4
13Ø DATA 16,1,56,42,136,16,246,1Ø9,252,19,1
   41,252,19,232,2Ø8,197,173,252
14Ø DATA 19,24,1Ø1,22,24,1Ø1,23,141,252,19,
   169,42,32,241,2Ø,32,188,2Ø,16Ø
15Ø DATA 2,185,185,2Ø,32,241,2Ø,136,16,247,
   165,116,2Ø8,9,165,117,2Ø8,5,169
16Ø DATA 145,32,241,2Ø,172,255,19,96,13,32,
   32,162,Ø,173,252,19,232,56,233
17Ø DATA 1ØØ,176,25Ø,1Ø5,1ØØ,2Ø2,24Ø,3,32,2
   32,2Ø,2Ø1,1Ø,176,5,2Ø5,252,19
18Ø DATA 24Ø,15,162,Ø,232,56,233,1Ø,16,25Ø,
   24,1Ø5,1Ø,2Ø2,32,232,2Ø,17Ø,72
19Ø DATA 138,9,48,32,241,2Ø,1Ø4,96,17Ø,173,
   Ø,255,72,169,Ø,141,Ø,255,138,32
2ØØ DATA 21Ø,255,1Ø4,141,Ø,255,96
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CHECKSUMS FOR *RUN* 1985 PROGRAMS

Last February, in response to many reader inquiries, we began a series of checksum listings for programs published in 1985 before our C-64 checksum program, 64 Perfect Typist, appeared in September '85. Working backwards, we have so far covered August, July, June, May, April and March. Below, we complete this series with the January and February 1985 programs' checksum listings.

To use the checksums, you must first load and run 64 Perfect Typist (see How to Type Listings, on page 122); then get out your January and February issues and begin typing in any program you find in the listings below. Every time you hit the return key, a number from 0 to 255 will appear. If you enter a line correctly, the number following the ":REM" next to the line number will appear.*

If you have already entered one of the programs and desire to check it for accuracy, simply enter 64 Perfect Typist, list lines individually or in small groups and position the cursor on the line you want to check. Next, press the return key, and, if you've entered the line correctly, the number that appears below the line will match the number following the ":REM" in the listings.*

Don't Forget, by Richard Lovett; January, p. 48.

```
5     :REM*73
10    :REM*190
15    :REM*191
20    :REM*16
25    :REM*159
30    :REM*154
35    :REM*185
40    :REM*184
45    :REM*93
50    :REM*204
55    :REM*133
60    :REM*74
65    :REM*39
70    :REM*64
75    :REM*69
80    :REM*226
85    :REM*47
90    :REM*198
95    :REM*91
100   :REM*208
105   :REM*193
110   :REM*16
115   :REM*231
120   :REM*174
125   :REM*97
130   :REM*146
135   :REM*123
140   :REM*178
145   :REM*219
150   :REM*104
155   :REM*243
160   :REM*160
165   :REM*159
170   :REM*130
175   :REM*33
180   :REM*28
185   :REM*245
190   :REM*50
195   :REM*33
200   :REM*168
205   :REM*157
210   :REM*220
215   :REM*211
220   :REM*214
225   :REM*117
230   :REM*232
235   :REM*207
240   :REM*54
245   :REM*39
250   :REM*56
255   :REM*157
260   :REM*149
265   :REM*46
270   :REM*1
275   :REM*74
280   :REM*109
285   :REM*156
290   :REM*213
295   :REM*228
300   :REM*167
305   :REM*210
310   :REM*249
315   :REM*136
320   :REM*243
325   :REM*150
330   :REM*29
335   :REM*58
340   :REM*235
345   :REM*70
350   :REM*213
355   :REM*98
360   :REM*47
365   :REM*176
370   :REM*229
375   :REM*2
380   :REM*1
385   :REM*108
390   :REM*83
395   :REM*76
400   :REM*143
405   :REM*38
410   :REM*169
415   :REM*118
420   :REM*13
425   :REM*180
430   :REM*71
435   :REM*176
440   :REM*165
445   :REM*40
450   :REM*167
455   :REM*146
460   :REM*127
465   :REM*154
470   :REM*207
475   :REM*108
480   :REM*101
485   :REM*182
490   :REM*47
495   :REM*154
500   :REM*185
505   :REM*196
510   :REM*31
515   :REM*55
520   :REM*156
525   :REM*181
530   :REM*238
535   :REM*193
540   :REM*6
545   :REM*189
550   :REM*206
555   :REM*7
560   :REM*204
565   :REM*213
570   :REM*214
575   :REM*87
580   :REM*224
585   :REM*127
590   :REM*102
595   :REM*247
600   :REM*114
605   :REM*9
610   :REM*84
615   :REM*129
620   :REM*16
625   :REM*143
630   :REM*66
635   :REM*57
640   :REM*198
645   :REM*15
650   :REM*116
655   :REM*245
660   :REM*168
665   :REM*195
670   :REM*218
675   :REM*221
680   :REM*186
685   :REM*85
690   :REM*232
695   :REM*7
700   :REM*230
705   :REM*205
710   :REM*34
715   :REM*79
720   :REM*158
725   :REM*177
730   :REM*230
735   :REM*55
740   :REM*48
745   :REM*129
750   :REM*240
755   :REM*53
760   :REM*70
765   :REM*211
770   :REM*167
775   :REM*190
780   :REM*213
785   :REM*108
790   :REM*179
795   :REM*234
800   :REM*139
805   :REM*50
810   :REM*115
815   :REM*100
820   :REM*231
825   :REM*54
830   :REM*91
835   :REM*128
840   :REM*239
845   :REM*198
850   :REM*203
855   :REM*8
860   :REM*237
865   :REM*44
870   :REM*179
875   :REM*182
880   :REM*89
885   :REM*48
890   :REM*211
895   :REM*60
900   :REM*197
905   :REM*36
910   :REM*171
915   :REM*176
920   :REM*245
925   :REM*24
930   :REM*139
935   :REM*172
940   :REM*167
945   :REM*198
950   :REM*89
955   :REM*150
960   :REM*97
965   :REM*168
970   :REM*143
975   :REM*226
980   :REM*43
985   :REM*254
990   :REM*63
995   :REM*246
1000  :REM*85
1005  :REM*74
1010  :REM*21
1015  :REM*102
1020  :REM*129
1025  :REM*47
```

Quatro, by Sol Steinberg; January, p. 40.

```
100   :REM*140
110   :REM*224
120   :REM*62
130   :REM*232
140   :REM*172
150   :REM*228
160   :REM*222
170   :REM*228
180   :REM*156
190   :REM*104
200   :REM*28
210   :REM*204
220   :REM*190
230   :REM*222
240   :REM*56
250   :REM*218
260   :REM*215
270   :REM*249
280   :REM*93
290   :REM*227
300   :REM*3
310   :REM*127
320   :REM*1
330   :REM*151
340   :REM*105
350   :REM*155
360   :REM*73
370   :REM*127
380   :REM*13
390   :REM*9
400   :REM*19
410   :REM*43
420   :REM*221
430   :REM*187
440   :REM*15
450   :REM*183
460   :REM*57
470   :REM*187
480   :REM*133
490   :REM*3
500   :REM*201
510   :REM*167
520   :REM*82
530   :REM*32
540   :REM*42
550   :REM*64
560   :REM*194
570   :REM*68
580   :REM*230
590   :REM*198
600   :REM*34
610   :REM*102
620   :REM*38
630   :REM*196
640   :REM*70
```

```
65Ø    :REM*76
66Ø   :REM*238
67Ø   :REM*172
68Ø    :REM*92
69Ø   :REM*24Ø
7ØØ   :REM*238
71Ø   :REM*244
72Ø   :REM*134
73Ø   :REM*248
74Ø   :REM*186
75Ø   :REM*216
76Ø   :REM*23Ø
77Ø   :REM*2Ø5
78Ø   :REM*235
79Ø    :REM*71
8ØØ   :REM*239
81Ø   :REM*173
82Ø   :REM*2Ø5
83Ø    :REM*21
84Ø   :REM*167
85Ø    :REM*97
86Ø   :REM*117
87Ø   :REM*185
88Ø   :REM*2Ø7
89Ø   :REM*189
9ØØ   :REM*1Ø3
91Ø   :REM*193
92Ø   :REM*147
93Ø   :REM*165
94Ø   :REM*159
95Ø   :REM*169
96Ø    :REM*63
97Ø   :REM*173
98Ø     :REM*9
99Ø   :REM*2Ø3
1ØØØ   :REM*75
1Ø1Ø    :REM*1
1Ø2Ø   :REM*31
1Ø3Ø  :REM*11Ø
1Ø4Ø  :REM*196
1Ø5Ø  :REM*114
1Ø6Ø  :REM*134
1Ø7Ø   :REM*7Ø
1Ø8Ø   :REM*6Ø
1Ø9Ø   :REM*74
11ØØ   :REM*54
111Ø  :REM*186
112Ø  :REM*112
113Ø  :REM*198
114Ø  :REM*24Ø
115Ø  :REM*248
116Ø  :REM*18Ø
117Ø  :REM*126
118Ø  :REM*14Ø
119Ø   :REM*16
12ØØ  :REM*146
121Ø   :REM*18
122Ø  :REM*184
123Ø  :REM*234
124Ø   :REM*42
125Ø  :REM*226
126Ø   :REM*3Ø
127Ø   :REM*98
128Ø   :REM*69
129Ø   :REM*93
13ØØ   :REM*13
131Ø  :REM*2Ø9
132Ø   :REM*41
133Ø  :REM*237
134Ø  :REM*167
135Ø  :REM*111
136Ø   :REM*31
137Ø  :REM*229
138Ø  :REM*243
139Ø  :REM*153
14ØØ  :REM*179
141Ø  :REM*165
142Ø  :REM*129
143Ø  :REM*215
144Ø  :REM*181
145Ø  :REM*235
146Ø  :REM*2Ø1
147Ø  :REM*255
148Ø  :REM*221
149Ø   :REM*19
15ØØ  :REM*241
151Ø   :REM*39
152Ø    :REM*5
153Ø   :REM*59
154Ø   :REM*26
155Ø   :REM*8Ø
156Ø  :REM*1Ø4
157Ø   :REM*68
158Ø  :REM*252
159Ø  :REM*168
16ØØ  :REM*124
161Ø  :REM*114
162Ø   :REM*28
163Ø   :REM*74
164Ø   :REM*58
165Ø   :REM*18
166Ø  :REM*244
167Ø   :REM*48
168Ø  :REM*252
169Ø   :REM*42
17ØØ  :REM*148
171Ø    :REM*4
172Ø   :REM*96
173Ø   :REM*74
174Ø   :REM*24
175Ø  :REM*146
176Ø   :REM*76
177Ø  :REM*15Ø
178Ø   :REM*32
179Ø  :REM*1Ø6
18ØØ  :REM*153
181Ø   :REM*63
182Ø  :REM*143
183Ø   :REM*61
184Ø  :REM*187
185Ø  :REM*157
186Ø   :REM*17
187Ø  :REM*177
188Ø   :REM*97
189Ø   :REM*57
19ØØ  :REM*173
191Ø   :REM*99
192Ø  :REM*187
193Ø   :REM*83
194Ø  :REM*1Ø3
195Ø   :REM*65
196Ø   :REM*47
197Ø   :REM*21
198Ø   :REM*39
199Ø  :REM*215
2ØØØ  :REM*221
2Ø1Ø  :REM*227
2Ø2Ø   :REM*37
2Ø3Ø   :REM*41
2Ø4Ø   :REM*45
2Ø5Ø  :REM*11Ø
2Ø6Ø   :REM*12
2Ø7Ø  :REM*188
2Ø8Ø  :REM*118
2Ø9Ø  :REM*252
21ØØ  :REM*1Ø4
211Ø  :REM*182
212Ø   :REM*2Ø
213Ø   :REM*72
214Ø   :REM*64
215Ø  :REM*196
216Ø  :REM*1Ø4
217Ø   :REM*54
218Ø  :REM*168
219Ø  :REM*2ØØ
22ØØ  :REM*124
221Ø    :REM*Ø
222Ø  :REM*148
223Ø  :REM*114
224Ø  :REM*23Ø
225Ø    :REM*6
226Ø  :REM*184
227Ø  :REM*176
228Ø  :REM*24Ø
229Ø  :REM*194
23ØØ   :REM*92
231Ø  :REM*215
232Ø   :REM*91
233Ø  :REM*255
234Ø  :REM*155
235Ø  :REM*247
236Ø  :REM*165
237Ø  :REM*2Ø7
238Ø  :REM*183
239Ø   :REM*17
24ØØ  :REM*1Ø5
241Ø  :REM*255
242Ø   :REM*51
243Ø   :REM*21
244Ø   :REM*19
245Ø  :REM*153
246Ø   :REM*69
247Ø    :REM*5
248Ø  :REM*243
249Ø   :REM*51
25ØØ  :REM*179
251Ø  :REM*229
252Ø   :REM*33
253Ø   :REM*39
254Ø  :REM*199
255Ø  :REM*149
256Ø  :REM*132
257Ø   :REM*8Ø
```

Smoking Joe, by Mark Jordan; January, p. 34.

```
1Ø    :REM*172
2Ø    :REM*23Ø
3Ø    :REM*1ØØ
4Ø      :REM*8
5Ø    :REM*116
6Ø    :REM*224
7Ø     :REM*9Ø
8Ø    :REM*192
9Ø    :REM*15Ø
1ØØ    :REM*82
11Ø    :REM*64
12Ø   :REM*218
13Ø   :REM*128
14Ø    :REM*92
15Ø   :REM*112
16Ø   :REM*234
17Ø    :REM*7Ø
18Ø    :REM*12
19Ø    :REM*24
2ØØ   :REM*246
21Ø   :REM*132
22Ø    :REM*74
23Ø   :REM*2Ø2
24Ø    :REM*78
25Ø    :REM*9Ø
26Ø   :REM*213
27Ø   :REM*2Ø5
28Ø   :REM*253
29Ø    :REM*33
3ØØ   :REM*1Ø3
31Ø    :REM*17
32Ø    :REM*25
33Ø    :REM*43
34Ø   :REM*135
35Ø   :REM*121
36Ø     :REM*1
37Ø    :REM*13
38Ø    :REM*57
39Ø    :REM*79
4ØØ   :REM*215
41Ø   :REM*217
42Ø     :REM*1
43Ø   :REM*2Ø3
44Ø   :REM*185
45Ø   :REM*155
46Ø   :REM*241
47Ø   :REM*197
48Ø    :REM*41
49Ø   :REM*241
5ØØ   :REM*251
51Ø   :REM*179
52Ø    :REM*34
53Ø    :REM*66
54Ø   :REM*116
55Ø    :REM*9Ø
56Ø    :REM*42
57Ø   :REM*196
58Ø   :REM*218
59Ø   :REM*24Ø
6ØØ   :REM*2ØØ
61Ø   :REM*216
62Ø   :REM*148
63Ø   :REM*23Ø
64Ø    :REM*28
65Ø   :REM*12Ø
66Ø    :REM*26
67Ø   :REM*232
68Ø    :REM*34
```

You're It!, by Gerald Coddington; February, p. 46

```
1      :REM*191
1Ø     :REM*232
2Ø     :REM*128
3Ø     :REM*222
4Ø      :REM*24
5Ø      :REM*86
6Ø     :REM*236
7Ø      :REM*66
8Ø     :REM*146
9Ø     :REM*13Ø
1ØØ    :REM*198
11Ø    :REM*116
12Ø     :REM*28
13Ø      :REM*6
14Ø    :REM*134
15Ø     :REM*88
16Ø     :REM*9Ø
17Ø     :REM*42
18Ø    :REM*146
19Ø    :REM*138
2ØØ    :REM*1ØØ
21Ø    :REM*15Ø
22Ø    :REM*22Ø
23Ø    :REM*118
24Ø     :REM*96
25Ø    :REM*13Ø
26Ø    :REM*131
27Ø    :REM*251
28Ø      :REM*1
29Ø    :REM*179
3ØØ    :REM*255
31Ø    :REM*1Ø7
32Ø     :REM*71
33Ø    :REM*163
34Ø    :REM*197
35Ø     :REM*57
36Ø    :REM*249
37Ø    :REM*1Ø1
38Ø    :REM*239
39Ø     :REM*85
4ØØ     :REM*77
41Ø    :REM*2Ø1
42Ø    :REM*2Ø3
43Ø    :REM*229
44Ø    :REM*2Ø1
45Ø    :REM*217
46Ø    :REM*225
47Ø    :REM*225
48Ø    :REM*243
49Ø     :REM*21
5ØØ      :REM*7
51Ø    :REM*117
52Ø    :REM*244
53Ø     :REM*48
54Ø    :REM*228
55Ø     :REM*94
56Ø     :REM*66
57Ø    :REM*174
58Ø     :REM*42
59Ø    :REM*192
6ØØ    :REM*1ØØ
61Ø    :REM*112
62Ø    :REM*18Ø
63Ø    :REM*244
64Ø    :REM*128
65Ø    :REM*178
66Ø    :REM*186
67Ø     :REM*34
68Ø    :REM*172
69Ø    :REM*248
7ØØ    :REM*25Ø
71Ø    :REM*11Ø
72Ø    :REM*188
73Ø    :REM*134
74Ø     :REM*72
75Ø    :REM*13Ø
76Ø    :REM*222
77Ø     :REM*49
78Ø    :REM*217
79Ø    :REM*113
8ØØ    :REM*155
81Ø    :REM*187
82Ø    :REM*151
83Ø     :REM*61
84Ø    :REM*117
85Ø    :REM*125
86Ø     :REM*75
87Ø     :REM*89
88Ø    :REM*151
89Ø    :REM*2Ø7
9ØØ    :REM*165
9Ø9    :REM*218
91Ø    :REM*163
92Ø    :REM*1Ø5
93Ø    :REM*219
94Ø    :REM*155
95Ø     :REM*97
96Ø     :REM*17
97Ø    :REM*147
98Ø     :REM*97
99Ø     :REM*43
1ØØØ    :REM*75
1Ø1Ø    :REM*147
1Ø2Ø    :REM*197
1Ø3Ø    :REM*146
1Ø4Ø    :REM*21Ø
1Ø5Ø    :REM*196
1Ø6Ø    :REM*2Ø4
1Ø7Ø     :REM*2Ø
1Ø8Ø    :REM*2Ø4
1Ø9Ø    :REM*2Ø4
11ØØ     :REM*46
111Ø    :REM*17Ø
112Ø    :REM*238
113Ø    :REM*14Ø
114Ø    :REM*2Ø8
115Ø     :REM*52
116Ø     :REM*22
117Ø    :REM*218
118Ø    :REM*17Ø
```

Tax Records 64, by Gary Fields; February, p. 60.

```
1       :REM*143
2       :REM*18Ø
6       :REM*178
1Ø       :REM*18
12      :REM*132
15      :REM*217
16       :REM*92
2Ø      :REM*2ØØ
21      :REM*241
22      :REM*122
24      :REM*23Ø
25      :REM*1Ø7
26      :REM*24Ø
27      :REM*239
3Ø       :REM*56
35      :REM*151
36      :REM*142
37       :REM*21
38        :REM*4
39      :REM*127
4Ø        :REM*2
41      :REM*185
42      :REM*23Ø
43      :REM*1Ø7
45      :REM*1Ø3
46      :REM*246
47      :REM*247
49      :REM*1Ø7
5Ø      :REM*14Ø
51      :REM*127
52      :REM*224
53       :REM*67
54       :REM*72
55      :REM*129
56       :REM*92
57      :REM*173
58      :REM*21Ø
59      :REM*167
6Ø       :REM*96
61      :REM*211
62      :REM*12Ø
7Ø        :REM*8
71        :REM*5
72      :REM*184
73      :REM*235
74      :REM*212
75      :REM*133
76      :REM*14Ø
77       :REM*11
78        :REM*2
79      :REM*137
8Ø      :REM*126
82      :REM*184
84      :REM*19Ø
86        :REM*6
87      :REM*133
89       :REM*81
9Ø      :REM*128
91      :REM*151
92       :REM*98
96       :REM*96
98       :REM*58
1ØØ      :REM*56
1Ø2      :REM*92
1Ø4      :REM*8Ø
1Ø8     :REM*1Ø4
2ØØ     :REM*13Ø
3ØØ     :REM*137
31Ø     :REM*139
34Ø      :REM*35
5ØØ     :REM*2Ø9
51Ø       :REM*1
53Ø      :REM*74
531      :REM*33
532       :REM*8
534     :REM*1ØØ
536      :REM*64
538     :REM*122
539     :REM*1Ø5
54Ø     :REM*234
541      :REM*91
542     :REM*138
543      :REM*45
544     :REM*218
545     :REM*2Ø3
55Ø     :REM*232
57Ø       :REM*2
571     :REM*221
572     :REM*124
573      :REM*51
574      :REM*46
575     :REM*139
576      :REM*8Ø
577      :REM*17
578     :REM*218
58Ø      :REM*4Ø
582     :REM*188
584      :REM*78
585      :REM*99
586     :REM*166
59Ø      :REM*32
6ØØ     :REM*12Ø
61Ø     :REM*19Ø
62Ø     :REM*224
63Ø       :REM*8
64Ø     :REM*234
645      :REM*29
646     :REM*216
65Ø      :REM*58
655     :REM*1Ø1
66Ø      :REM*9Ø
665      :REM*57
667     :REM*229
68Ø      :REM*16
7ØØ     :REM*242
71Ø       :REM*4
72Ø       :REM*4
721     :REM*123
722      :REM*12
724      :REM*48
726      :REM*84
728     :REM*172
73Ø     :REM*188
732     :REM*154
734     :REM*152
736     :REM*238
738       :REM*8
74Ø     :REM*1Ø6
742      :REM*36
744      :REM*98
8ØØ     :REM*115
81Ø     :REM*211
818     :REM*147
82Ø      :REM*43
822     :REM*1Ø9
824     :REM*247
826     :REM*129
828      :REM*11
83Ø     :REM*151
832      :REM*45
834       :REM*3
836     :REM*231
838     :REM*135
84Ø     :REM*197
842     :REM*193
85Ø      :REM*87
9ØØ     :REM*1Ø7
91Ø      :REM*17
912     :REM*113
914      :REM*69
915     :REM*2Ø6
916     :REM*111
918     :REM*2Ø5
92Ø      :REM*71
926     :REM*1Ø1
928      :REM*27
93Ø     :REM*167
932     :REM*163
948     :REM*161
95Ø      :REM*87
955     :REM*138
96Ø      :REM*75
1ØØØ    :REM*145
1ØØ2     :REM*65
1ØØ4    :REM*1Ø7
1ØØ5    :REM*234
1ØØ6    :REM*129
11ØØ     :REM*44
11Ø2    :REM*184
11Ø3    :REM*137
11Ø4    :REM*228
12ØØ    :REM*19Ø
12Ø2    :REM*198
12Ø4     :REM*54
12Ø6     :REM*74
13ØØ     :REM*41
13Ø2     :REM*27
13Ø4     :REM*61
13Ø6    :REM*175
14ØØ     :REM*83
14Ø2    :REM*147
14Ø3    :REM*188
14Ø4     :REM*17
15ØØ    :REM*217
15Ø2    :REM*139
15Ø4    :REM*123
17ØØ    :REM*12Ø
17Ø2    :REM*248
17Ø4     :REM*34
17Ø5     :REM*45
17Ø6     :REM*22
17Ø8     :REM*22
2ØØØ    :REM*247
2Ø1Ø     :REM*39
2Ø2Ø    :REM*165
2Ø25     :REM*6Ø
2Ø3Ø    :REM*139
2Ø4Ø     :REM*91
2Ø45    :REM*196
2Ø5Ø     :REM*58
2Ø6Ø    :REM*188
2Ø65    :REM*241
2Ø67    :REM*173
21ØØ    :REM*1Ø2
211Ø     :REM*68
212Ø    :REM*156
2125    :REM*179
213Ø    :REM*146
214Ø    :REM*2ØØ
215Ø     :REM*2Ø
216Ø    :REM*186
218Ø    :REM*11Ø
22ØØ    :REM*118
221Ø      :REM*4
55ØØ     :REM*93
551Ø    :REM*215
5515     :REM*24
552Ø    :REM*247
5524    :REM*147
5525     :REM*34
5526     :REM*83
5527     :REM*38
5529    :REM*2Ø8
553Ø    :REM*211
5532     :REM*29
5534    :REM*195
5536    :REM*117
7ØØØ    :REM*117
7Ø1Ø    :REM*171
7Ø2Ø     :REM*53
7Ø25    :REM*178
7Ø3Ø    :REM*117
7Ø35     :REM*66
7Ø4Ø     :REM*97
7Ø42    :REM*249
7Ø43     :REM*64
7Ø44    :REM*149
7Ø45    :REM*1Ø6
7Ø46     :REM*87
7Ø48     :REM*41
7Ø52    :REM*255
7Ø54    :REM*199
7Ø56     :REM*41
7Ø58     :REM*35
7Ø59    :REM*2Ø4
7Ø6Ø      :REM*33
7Ø62     :REM*49
7Ø65     :REM*98
7Ø66    :REM*111
7Ø67    :REM*11Ø
7Ø7Ø     :REM*121
7Ø71     :REM*82
7Ø72     :REM*85
7Ø75    :REM*224
7Ø76     :REM*97
7Ø77     :REM*32
7Ø78    :REM*233
7Ø8Ø    :REM*137
7Ø81    :REM*146
7Ø82     :REM*95
7Ø83    :REM*192
7Ø84    :REM*249
7Ø85    :REM*17Ø
7Ø87     :REM*66
7Ø9Ø     :REM*97
72ØØ      :REM*8
7205    :REM*143
721Ø    :REM*234
7215    :REM*161
722Ø    :REM*182
724Ø    :REM*116
725Ø    :REM*226
7251    :REM*151
7252     :REM*74
74ØØ     :REM*7Ø
7406     :REM*64
741Ø    :REM*164
7412     :REM*98
7414    :REM*236
7418    :REM*124
76ØØ    :REM*153
7605    :REM*232
761Ø     :REM*13
762Ø     :REM*89
7625    :REM*194
763Ø     :REM*39
7635     :REM*52
78ØØ     :REM*98
781Ø    :REM*182
782Ø     :REM*96
783Ø    :REM*1Ø2
7835    :REM*245
784Ø     :REM*52
785Ø    :REM*14Ø
786Ø     :REM*76
787Ø    :REM*138
7875    :REM*123
788Ø    :REM*148
789Ø    :REM*244
7895     :REM*59
7898    :REM*254
79ØØ     :REM*94
791Ø    :REM*196
```

Scrambler, by Chuck McGaffin; February, p. 80.

```
5         :REM*9
1Ø      :REM*226
15      :REM*1Ø9
2Ø       :REM*64
25      :REM*215
3Ø        :REM*6
35      :REM*235
4Ø      :REM*116
45      :REM*155
5Ø      :REM*242
55      :REM*185
6Ø      :REM*122
65      :REM*127
7Ø      :REM*166
75      :REM*155
8Ø        :REM*4
85      :REM*211
9Ø      :REM*248
95       :REM*37
1ØØ      :REM*78
1Ø5     :REM*221
11Ø     :REM*136
115     :REM*199
12Ø      :REM*16
125      :REM*95
13Ø     :REM*1Ø8
135     :REM*217
14Ø      :REM*58
145     :REM*1Ø7
15Ø      :REM*96
155     :REM*243
16Ø     :REM*242
165      :REM*39
17Ø     :REM*156
175     :REM*123
18Ø       :REM*6
185      :REM*59
19Ø       :REM*7Ø
195     :REM*153
2ØØ      :REM*74
2Ø5     :REM*145
21Ø     :REM*212
215     :REM*163
22Ø     :REM*198
225      :REM*67
23Ø     :REM*24Ø
235     :REM*165
24Ø      :REM*54
245     :REM*253
25Ø      :REM*54
255      :REM*75
26Ø      :REM*89
265      :REM*7Ø
27Ø     :REM*175
275      :REM*7Ø
28Ø     :REM*249
285      :REM*7Ø
29Ø     :REM*1Ø7
295     :REM*23Ø
3ØØ     :REM*199
3Ø5     :REM*23Ø
31Ø     :REM*187
315       :REM*Ø
32Ø     :REM*223
325     :REM*138
33Ø      :REM*37
335     :REM*152
34Ø     :REM*227
345     :REM*2Ø8
35Ø      :REM*91
355      :REM*2Ø
36Ø      :REM*99
365     :REM*128
37Ø       :REM*1
375      :REM*78
38Ø      :REM*57
385      :REM*9Ø
39Ø      :REM*65
395      :REM*46
4ØØ     :REM*1Ø3
4Ø5     :REM*184
41Ø      :REM*35
415      :REM*74
42Ø      :REM*71
425      :REM*72
43Ø     :REM*155
435     :REM*18Ø
44Ø     :REM*241
445     :REM*214
45Ø     :REM*125
455     :REM*198
46Ø      :REM*43
465      :REM*58
47Ø     :REM*111
475     :REM*112
48Ø      :REM*49
485     :REM*222
49Ø      :REM*77
495     :REM*21Ø
5ØØ      :REM*197
5Ø5      :REM*25Ø
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March

COMING ATTRACTIONS

VIDEO DIGITIZERS—In the March issue of *RUN*, we'll introduce you to the world of video digitizing. Our author, a former photographer and videographer, will describe this captivating technology and its applications, including how you can capture your own favorite images with your C-64.

DFPRINT—This accessory program for *RUN*'s popular Datafile database system will let C-64 owners create and customize mailing labels and reports.

MPS-1200 PRINTER—Also in March, *RUN*'s technical editor, Tim Walsh, will take a look at Commodore's latest low-cost dot matrix printer.

SPRITE PRINTER—You'll want to "spriten" up your graphics printouts with this C-64 program that improves on conventional sprite printouts.

A HEALTHY APPLICATION—Diabetes is the third leading cause of death in the United States—but how much do you know about it? Read how the American Diabetes Association is using Commodore computers to educate and motivate the public.

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8	Abacus Software	77
185	Abacus Software	90
89	Abacus Software	105
7	Access Software	CIII
188	ActionSoft Corp.	40, 41
5	Activision	9
*	American Int'l Products	83
79	Aprotek	87
*	Batteries Included	CII
134	Berkeley Softworks	18, 19
111	Berkeley Softworks	20, 21
138	Berkeley Softworks	23
139	Berkeley Softworks	25
140	Berkeley Softworks	27
*	C.O.M.B	45
192	Cardinal Software	122
81	Central Point Software, Inc.	39
251	Compumed	123
64	CompuServe	28, 29
*	Computer Centers of America	93
274	Computer Friends	30
70	Computer Mart	97
*	Comp. Supplies of Peterborough	117
147	Computer Swap	104
300	Covox, Inc.	123
*	Crown Custom Covers	82
46	Digital Solutions	CIV
*	DiskAssist	112
3	Electronic Arts	7
3	Electronic Arts	59
156	Emerald Components	74
85	Epyx	12
12	Epyx	31
144	Free Spirit Software	44
*	GE Information Services	49
4	H&M Marketing	113
95	Hearsay, Inc.	1
120	IHT Software	105
35	InConTrol, Inc.	120
24	Inkwell Systems	110
*	Intelligent I/O, Inc.	82
202	Jason-Ranheim	121
145	KFS Software, Inc.	121
*	K-Soft	122
*	Lyco Computer	60, 61
136	Master Software	112

Reader Service		Page
68	Micro Prose Software	47
207	MicroComputer Services	109
38	MicroCube Corp.	120
91	Microlog Corp.	119
82	Midnite Press	115
*	Mindscape Inc.	17
98	Montgomery Grant	71
*	NRI Schools	65
60	Omnitronix	72
62	Prism Software	2
93	Professional Software, Inc.	32
223	Pro-Tech-Tronics	66, 67
15	Protecto Enterprizes	84, 85
220	Quinsept	113
	RUN	
	RUN Sub Ad	33
	ReRUN Back Issues	95
	ReRUN Subscriptions	48
	ReRUN Special Ad	80
	RUN Class Ads	127
	Jesse Jones Ad.	39
*	S&S Wholesalers	75
254	Software Discounts of America	103
92	Star Micronics	79
25	Strategic Simulations, Inc.	53
84	Softsync	3
78	SubLogic Corp.	57
26	SubLogic Corp	43
155	Tenex Computer Express	89
146	Timeworks, Inc.	51
209	Tussey Computer Products	14, 15
69	Underware	106
76	Uptime	11
80	VG Data Shack	6
121	Value-Soft	69
86	Wenger Corp.	88
97	White House Computers	91
96	Xetec, Inc.	82

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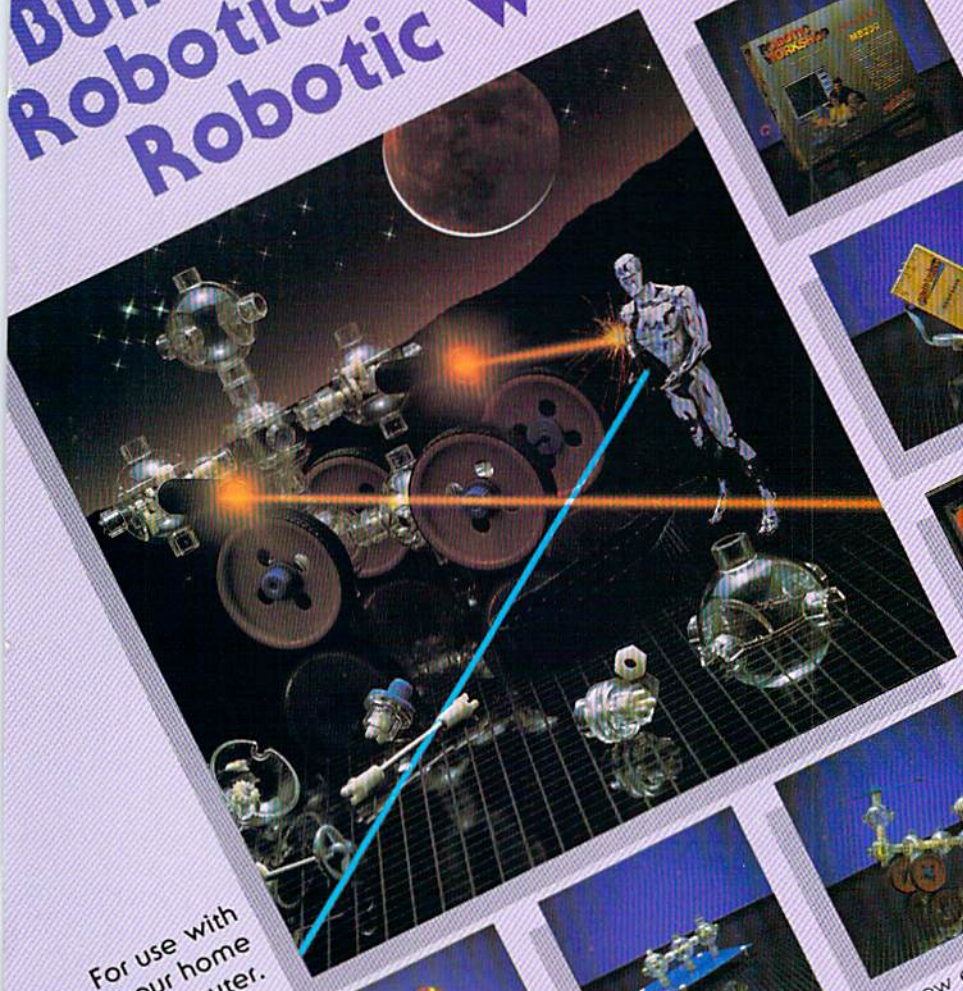

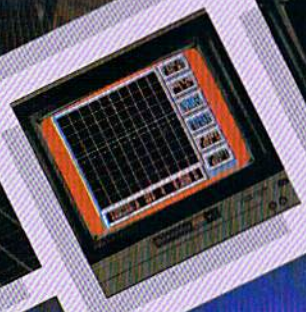

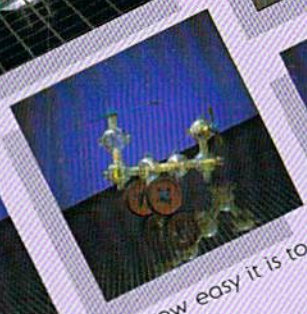

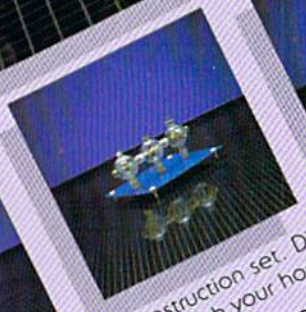

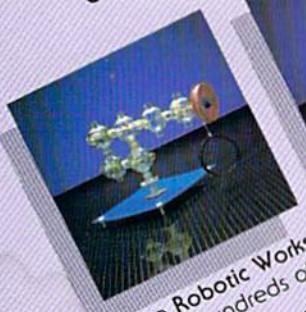

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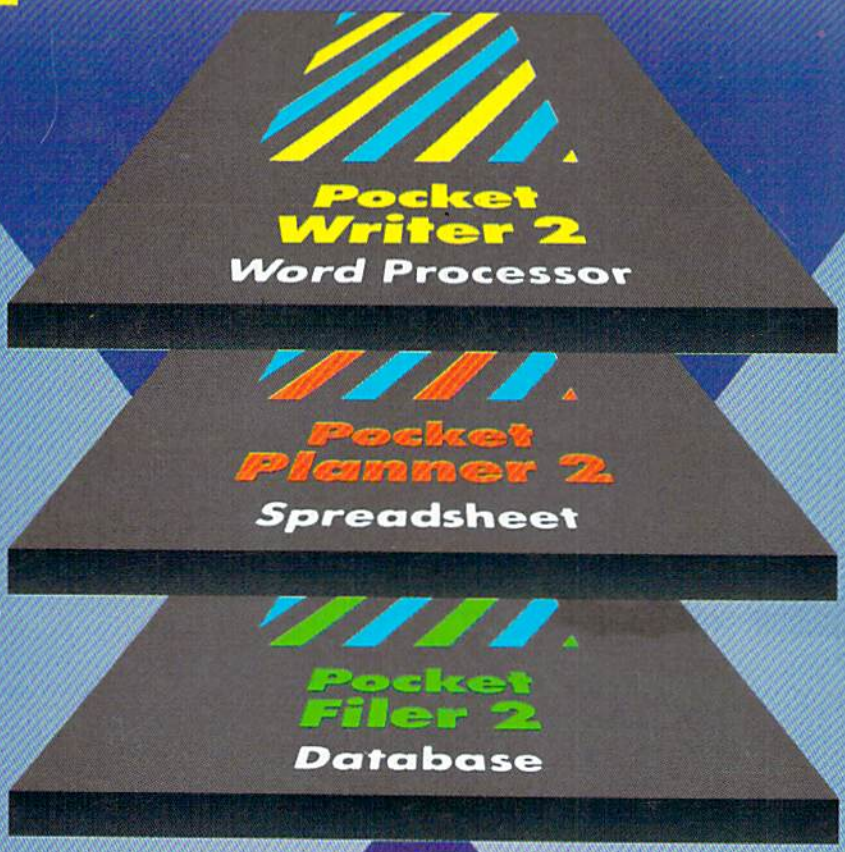

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